Bank of Jamaica

Financial Stability Report

2009

Nethersole Place
Kingston
Jamaica

Telephone: (876) 922 0750-9
Fax: (876) 922 0854
E-mail: library@boj.org.jm
Website: www.boj.org.jm

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Preface

The maintenance of financial stability by the Bank of Jamaica (BOJ) primarily concerns the safeguard of conditions which ensure the proper and efficient functioning of the financial system and consequently, the promotion of real economic activity. The financial system consists directly of three basic financial components: institutions, markets and infrastructure.[1] These components interact with each other as well as with other indirect participants in the system – such as households, non-financial corporations and the public sector – to allocate economic resources and redistribute financial risks.

Aside from the supervision of banks, the BOJ is charged with the responsibility of ensuring that the overall financial system is robust to shocks and that participants are assured of its robustness. This entails making sure that financial institutions, in particular banks, are sound. The maintenance of financial stability by the Bank also involves overseeing the efficient and smooth determination of asset prices, making certain that participants honour promises to settle market transactions and preventing the emergence of systemic settlement risk arising from various financial imbalances that may develop within individual institutions or the system.

The Financial Stability Report 2009 provides an assessment of the main financial developments, trends and vulnerabilities influencing the stability of Jamaica's financial system during the year. The Report covers:

i) an overall assessment of financial stability;
ii) domestic macro-financial developments;
iii) global financial developments;
iv) financial system developments;
v) banking system exposures;
vi) risk assessment of the banking sector; and
vii) payment system developments.

Comments and suggestions from readers are welcome. Please email your feedback on this report to library@boj.org.jm.

[1] Financial institutions include *inter alia* banks, securities firms, insurance companies, unit trusts, mutual funds and pension funds. Financial markets include *inter alia* foreign exchange, money and capital markets. Financial infrastructure refers to payment and settlement systems.

1. Financial Stability Overview

Macroeconomic Environment

Throughout 2009, the major industrial countries continued to be adversely affected by the economic shocks triggered by the global financial crisis in 2008. However, the Jamaican economy exhibited considerable resilience, as the decline in economic activity and the resultant increase in unemployment were less pronounced than for other countries in the Caribbean region.

Developments within the domestic bond market were mostly favourable during 2009. This was in a context of positive trends in key economic indicators such as inflation, balance of payments, and the foreign exchange rate. There was, however, a general deterioration in the performance of the Government of Jamaica (GOJ) global bonds market during the year. This was in a context where bond prices and yields reacted to downgrades of Jamaica's sovereign debt credit rating by Moody's, Standard and Poor's and Fitch. In addition, the market was negatively affected by delays in the signing of the proposed International Monetary Fund (IMF) borrowing programme (see Chapter 2).

The resilience of the Jamaican economy to adverse shocks from the global financial turmoil was also evident in the performance of the domestic stock market. The main Jamaica Stock Exchange (JSE) Index, which was expected to decline in 2009 given the macro-economic fundamentals, improved marginally for 2009. The improved performance was influenced by lower domestic interest rates, relative stability in the foreign exchange market, and improved profitability for several listed companies (see Chapter 5).

The foreign exchange market experienced relative stability for most of 2009. However, the market was characterized by significant pressures during the early part of the year. These pressures were influenced by contractions in foreign currency inflows, as well as high levels of Jamaica Dollar liquidity which facilitated an increase in demand for US dollars. To curtail instability in the market, the Bank of Jamaica (BOJ) implemented various initiatives, which included moral suasion, the establishment of a foreign exchange facility for public sector entities and the intermediation of foreign currency flows. These policy actions assisted in maintaining stability in the foreign exchange market. Stability in the foreign exchange market, in the second half of the year, was also facilitated by relatively weak domestic demand conditions (see Chapters 2 and 6).

Global Environment

Global macroeconomic and financial developments during 2009 showed some recovery in the second half of the year, following the deepest global economic downturn in recent history. Although the pace of recovery differed from region to region, positive economic growth returned to most advanced economies in the fourth quarter of 2009. As economic fundamentals improved and public support measures remained in place, systemic risks continued to subside. The negative impact was somewhat less severe than originally anticipated by the international community, as strong fiscal and monetary stimuli were promptly implemented worldwide. The latter also contributed to some improvement in global financial market conditions. Going forward, the major countries are expected to register positive, albeit weak growth in the near-term to medium-term, conditioned by gradual fiscal retrenchment and the expected implementation of exit strategies by central banks.[2] Despite these improvements, conditions in the global financial system are still influenced by above-normal levels of uncertainty and financial stability remains fragile in a number of advanced economies and those emerging-market economies (EMEs) that had been hardest hit by the crisis (see Chapter 3).

Although systemic risks appear to have diminished during the period under review, there has been an increase in the interconnectedness of risks following the global financial crisis.[3] This requires an integrated and more systemic approach to risk management by both public and private sectors. The World Economic Forum (WEF) expressed its concern about "slow failures" or "creeping risks" and identified them as the biggest threats facing the world today. These risks emerging over a long

[2] Exit strategies refer to the abandonment of the monetary and fiscal policies implemented specifically to address the impact of the financial crisis.
[3] World Economic Forum, January 2010. Global risks 2010: A global risk network report.

period have a potentially large impact and their long-term implications are often underestimated. Global population growth, the resulting rise in consumption and the ageing of populations are cases in point and could, for example, have serious implications for the availability of resources. Other important risks emanating from the global financial and economic environment are: first, that the global economic recovery could lose some momentum due to weak financial systems, negative developments in commercial real-estate markets and rising unemployment. Second, there are concerns about worsening fiscal positions in some countries causing volatility in financial markets and suppressing the global economic recovery by raising the cost of borrowing for households and businesses. Finally, continued credit supply constraints, further deleveraging, and a lack of progress in bank restructuring and recapitalization could possibly undermine global economic recovery (see Chapter 3).

The Domestic Financial System

The observed system-wide deterioration in the quality of bank assets, reflected in the significant rise in both deposit taking institutions' (DTIs) and non-bank financial institutions' (NBFIs) non-performing loans, was matched by increases in the loan loss provisioning (LLP) by banks. This factor should mitigate any negative impact on banks if these credit risks materialize.

A deceleration in both household and non-financial corporation credit growth resulted in a slower expansion in aggregate bank balance sheet. This reflected both demand and supply factors: the uncertain economic prospects and a general reduction in demand for credit by non-financial corporations on the one hand, and stricter credit approval requirements imposed by the banks on the other. Indeed, throughout the year, bond issues were heavily oversubscribed, indicating a strong search for yield among households amidst an environment of low deposit interest rates.

The aggregate profitability of the banking sector declined during the year, driven largely by a reduction in net interest income. This decline in net interest income, which nevertheless remained the banks' main source of revenue, resulted from a combination of weaker household demand for credit and higher cost of borrowing. Profitability was further affected by reductions in income generated from service charges, transaction fees, and commissions (see Chapter 4).

For the year under review banks remained well capitalized, with regulatory ratios above the minimum requirement (see Chapter 4). Indeed, capital adequacy ratios improved during the year, despite an annual increase in risk-weighted assets of 11.6 per cent. The latter reflected a rebalancing towards more interbank lending, as well as subdued lending growth. Despite the adoption of tighter lending standards, however, there is no evidence to suggest that banks undertook or intended to undertake, any significant deleveraging.

Risks to financial stability emanating from the investment funds sector remained negligible during 2009. The liquidity position of securities dealers for the year under review was relatively strong. This was influenced by significant holdings of short-dated GOJ securities. In addition, capital adequacy ratios of these dealers were significantly above the prudential benchmark of 10.0 per cent (see Chapter 6). Together, these liquidity positions and capital buffer provide strong support for financial stability in this sector.

The insurance sector continued to expand during 2009, with its operational revenue recovering from a plateau phase in the immediate aftermath of the global financial crisis. Nevertheless, the non-life insurance segment suffered from the strong losses incurred by a foreign subsidiary of one domestic insurance company.

Banking System Exposures

The adverse economic shocks triggered by the global financial crisis were primarily absorbed by DTIs, which recorded a decline in profitability for the year (see Chapter 4). This occurred in a context of a reduction in loans to the household sector, as well as the *Mining* and *Transport, Communication &*

Storage sectors (see Chapter 5). Despite an annual increase in households' disposable income for 2009, the debt-servicing capacity of this sector came under pressure. Indeed, non-performing loans (NPLs) increased at a faster pace than disposable income, and are likely to rise further in the near-term, despite the projected recovery over the medium-term to long-term. Another sign of stress was the higher incidence of rescheduled loans. These were to a large extent influenced by the ongoing contraction in the property market, as well as higher loan rates charged on personal and mortgage loans. On the other hand, higher households' net financial wealth, driven by the turnaround in financial markets, mitigated some of the adverse impact on debt servicing.

In the wake of constrained economic conditions during 2009, the financial strength of the non-financial corporate sector showed mixed signals. In particular, there was increased profitability in the *Manufacturing* and *Tourism* sectors which was attributable to increased operational efficiencies, while deterioration in the financial strength of the *Insurance* and *Retail* sectors reflected lower consumer demand and the general slowdown in economic activity (see Chapter 5). The overall picture is corroborated by the financial results of companies listed on the JSE.[4] The profitability in the corporate sector was supported by a marginal increase in the sector's loan portfolio, reflecting weaker aggregate demand.

Concerns about Government of Jamaica (GOJ) sovereign risk intensified during the year, as both the domestic and external debt stock increased significantly, relative to the previous year (see Chapter 2). In tandem with this, a flight-to-quality negatively affected the yields on GOJ Global bonds in 2009. To reduce their exposure to the risk of sovereign debt default, banks in the system condensed their portfolio holdings of external GOJ debt. The build-up in the domestic debt stock reflected a deteriorated fiscal position for 2009. These domestic investments were concentrated in the shorter end of the maturity profile exacerbating the refinancing risk of the GOJ debt portfolio. However, these risks for the GOJ should be reduced with the introduction of a proposed Jamaica Debt Exchange (JDX) programme (see Chapter 5). This by extension should reduce the banking system's exposure to public sector debt.

Risk Assessment of the Banking System

The recent crisis highlighted the financial institutions' exposure to adverse conditions in the international financial system. Although banks in Jamaica were relatively well shielded from the direct effect of the financial crisis, they remained exposed to the feedback loop affecting economies worldwide. Against this backdrop, credit risk monitoring assumed greater importance.

The financial turmoil also revealed the potential risk from exposure to foreign currency-denominated loans and exchange rate fluctuations. However, lending in foreign currency by domestic banks constitutes a negligible amount of their loan portfolio, thus the extent of such a risk is minimal. The credit risks inherent in the banks' loan portfolio noted in the 2008 Financial Stability Report (FSR) began to materialise during 2009, with the banks reporting deterioration in the quality of some of their exposures and a further deterioration is anticipated for 2010 (see Chapter 6). Interest rate risk diminished during 2009, as the re-pricing gap narrowed. This was attributable to a shortening in the re-pricing period of assets (see Chapter 6). Indicators quantifying market risk, such as VaR, declined for the year under review. This indicates both an active risk reduction and the impact of lower market volatility.

In general, all stress tests of the financial system confirmed the banking system's ability to withstand extreme yet plausible shocks. Indeed, the indications are that the banks should be able to withstand all the hypothetical strong adverse shocks which were modeled (see Chapter 6).[5] Nevertheless, banks should continue to strengthen their capital buffers to be able to withstand possible further challenges as identified in various sections of this Report.

[4] The advance-to-decline ratio at end-2009 was 17:19, compared to an 8:28 ratio at end 2008 (see Chapter 5).

[5] The shocks include, deterioration in average deposits, depreciation in the Jamaica Dollar, increase in the domestic and foreign interest rates, and a severe increase in the stock of NPLs

Payment System Developments

The payment and settlement systems in Jamaica remained resilient and continued to operate efficiently throughout 2009, contributing to the stability of the financial system.

During the year, the BOJ implemented two new payments systems with a view to promote the safety and efficiency of the financial system, achieve compliance with best practices and international standards and timely submission of statistics and information required by the Bank to execute its oversight function. In February 2009, the Bank established a Real Time Gross Settlement (RTGS) system, to replace the existing Customer Inquiry Funds Transfer System (CIFTS). In addition, the Central Securities Depository (CSD) was established in May 2009 (see Chapter 7).

Lower payment system credit risk was achieved with the new systems, particularly in a context where the average RTGS system credit transfer for 2009 was significantly below the average credit transfer under the CIFTS for 2008.

Outlook

Going forward, the current review of regulatory regimes which international standard setting bodies are undertaking is likely to impact the business strategies of domestic banks.[6] The proposed changes are designed to improve the quality of bank capital through a narrower definition of what constitutes core capital, as well as to impose stricter liquidity requirements.

As in other EMEs, the outlook for financial stability in Jamaica has improved somewhat since 2008, but still remains uncertain, to a large extent due to weak and uneven economic growth prospects. In addition, any erosion of competitiveness may inhibit the domestic economy from the benefits inherent in the recovery of the major economies. Thus, there appear to be downside risks to household income prospects and corporate profitability, possibly exacerbating pockets of vulnerability and impairing debt servicing capacities. Though the impact is not expected to be widespread, thinned buffers and high levels of indebtedness are expected to affect the financial system, and the upward trend in non-performing loans evident throughout 2009 is expected to persist, particularly as these tend to react with a lag. The vulnerability of borrowers may be further exposed if interest rates eventually start to rise, though such a scenario is not expected in the near-term. Indeed, the BOJ is expected to be cautious in implementing exit strategies. Increased credit risk in turn should be tempered based on the adequacy of LLPs by banks. Loan loss provisioning for 2009 which was significantly higher than that for 2008, and the five year annual average, appear to be commensurate with the observed further deterioration in the quality of banks' loan portfolios.

Against this background, banks are expected to continue to reassess their risk appetite to adhere to credit risk guidelines and to moderate expansion in their loan books. To date, no significant deleveraging has been observed. However, some amount of deleveraging could materialise in the near-term as banks adjusts their portfolio mix in light of lower asset positions. Nevertheless, these institutions remain vulnerable to credit exposure, despite anticipated improvements in the economic conditions.

In this regard, the banks' ability to maintain high capital ratios may, therefore, come under pressure. Indeed, near-term to medium-term profitability is unlikely to match pre-crisis levels, against a background of slower growth in loan portfolios and intensified competition for deposits.

Thus, in the period ahead, the banks may need to reassess their dividend policies in order to support the amount of capital commensurate with the risk embedded in their business model. This is necessary to strengthen the institutions' shock-absorbing capacity. As shown by the onset of the financial crisis, capital needed in a period of distress, both in terms of value and of quality, tend to be higher than indicated by minimum regulatory ratios. Accordingly, the ongoing international initiatives are likely to translate into stricter capital requirements. Similarly, the banks' liquidity strategies may also need to be re-assessed.

[6] Standard setting bodies include for example, Basel Committee on Banking Supervision, and Committee on the Global Financial System.

Although the domestic banks' liquidity ratios comfortably exceed regulatory requirements, these requirements may become more stringent once the options being considered by international standard setters are implemented.

No major risks to financial stability are expected to arise from the insurance and investment sectors, particularly as these entities remain relatively small. However, contagion risk cannot be ignored, particularly on account of the close interconnectedness between these sectors and the other financial intermediaries.

Overall, the Jamaican financial sector, shielded as it was by its conservative retail funding model and regulatory oversight, showed resilience to the global financial crisis. In the near-term, business practices are likely to remain unchanged, although falling profitability may induce firms to take greater risks. However, the likelihood that low interest rates going forward would encourage excessive risk taking by the corporate sector and financial institutions alike is not perceived to be very high at this stage. Further, if credit to sectors where bank exposures are already high, slows down, then financial stability conditions may improve even further.

While the direct impact from the financial crisis diminished during the year under review, this was counterbalanced by adverse economic developments. As a result, the resilience of financial institutions is likely to be tested further. At this present juncture, however, no major system-wide shocks are expected to crystallise. In addition, stress test results broadly confirm the resilience of the banking system. However, improving institutions' shock absorption capacity even further remains imperative, and should likely be the near-term focus of any regulatory change. Furthermore, a pro-active approach would soften the possible impact of the international regulatory overhaul when this is actually implemented.

On balance, therefore, the outlook points to further challenges ahead. The effects of the challenges depend on the strength of the economic recovery and its sustainability, both of which remain uncertain.

2. Domestic Macro-Financial Developments

2.1 Overview

The Jamaican macroeconomy continued to exhibit signals of distress in the first quarter of 2009 as a result of the residual effects of the global financial crisis. However, some level of stability was achieved towards the end of the June 2009 quarter largely as a result of actions taken by the BOJ. Stability was further achieved in the third and fourth quarter of 2009 as a result of the announcement by the GOJ of its intentions to re-engage the International Monetary Fund (IMF) for a standby loan arrangement. These factors resulted in the improvement in a number of key economic variables as well as a rebound in consumer and business confidence (see Figure 2.1 and Figure 2.2). The banking system reflected lower risk as measured by the Z score, an index of insolvency risk. However there was a deterioration in the macro prudential early warning index for the banking system for the review period.

2.2 Bond Market

The instability in the financial sector for the first quarter of 2009 was evident as bond spreads were extremely volatile relative to the signal 180-day treasury bill rate. However, there was a marked reduction in the level of volatility towards the end of 2009 signaling some stability in the domestic bond market. This was due to confidence being rebuilt in the market on the announcement in the second quarter of 2009 of the GOJ's intentions to return to the IMF for funding support. Further stability was achieved as a result of the GOJ's announcement of the Jamaica Debt Exchange (JDX) initiative which was launched in the first month of 2010.

The increased confidence in the market resulted in the BOJ being able to reduce rates on its suite of open-market (OMO) instruments at different intervals throughout 2009 (see Figure 2.4). In a context of stability in the foreign exchange market during the June quarter the Bank of Jamaica (BOJ) reduced rates associated with the 365-day

Figure 2.1 Selected Macroeconomic Indicators

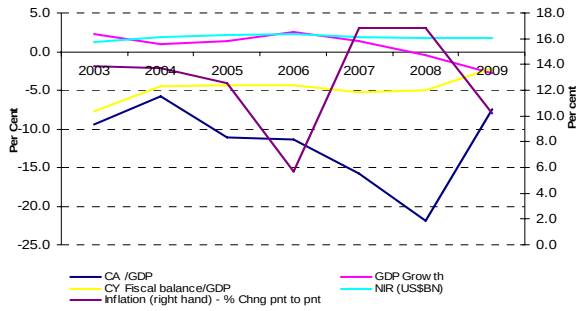


Figure 2.2 Indices of Consumer and Business Confidence

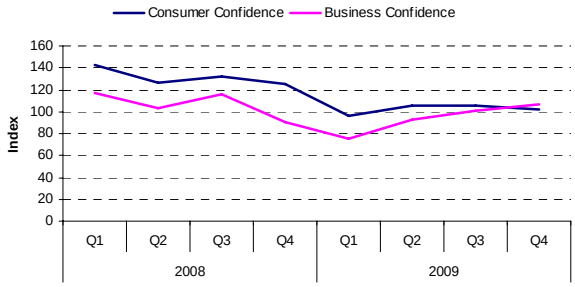
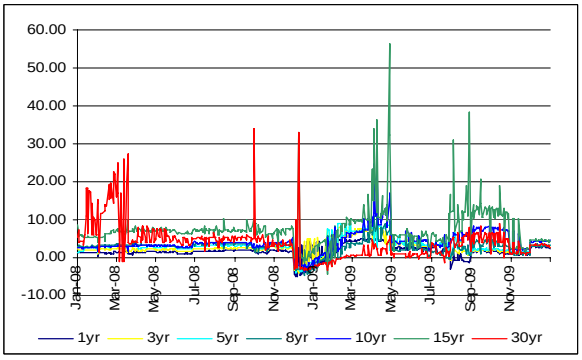
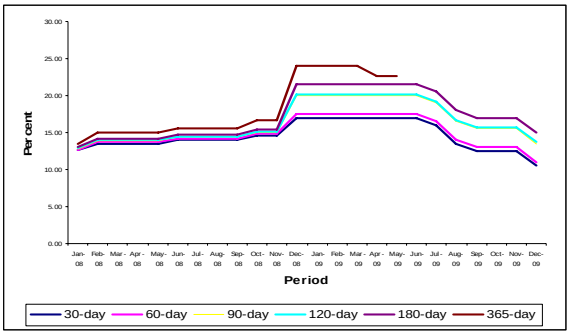


Figure 2.3 Spreads of Daily GOJ Domestic Bond Yields & 180-Day Rates



Source: Bloomberg

Figure 2.4 BOJ OMO rates for 2008 and 2009



Source: BOJ

Figure 2.5 99th Percentile 10-day change in GOJ Domestic

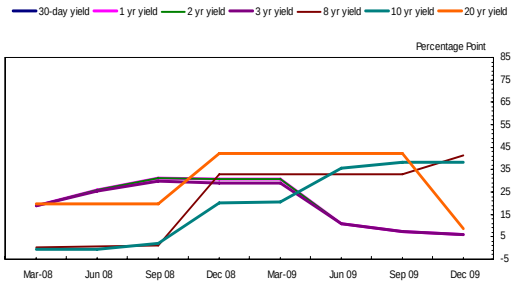
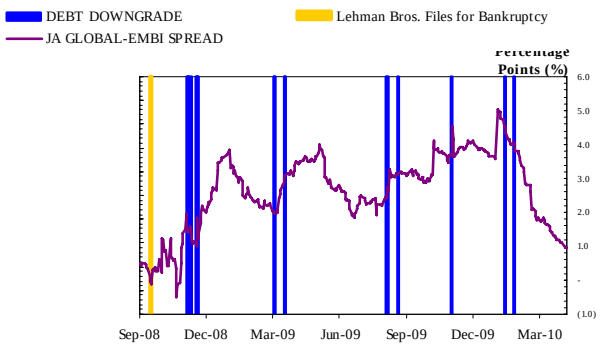


Figure 2.6 Jamaica EMBI+ Global Bond Spread



OMO instrument by 133 basis points (bps) to 22.67 per cent. The instrument was subsequently removed from the schedule of OMO instruments as the BOJ focused on issuing shorter term instruments (See Figure 2.4). Consequent on these developments, the risk associated with GOJ domestic bonds declined during 2009 as indicated by a decrease in the 10-day interest rate value-at-risk (VaR) for all tenors, with the exception of the 8-year bond during the year (see Figure 2.5). The VaR associated with GOJ domestic bonds recorded sharp declines particularly for the 20-year bond in the last quarter of 2009 as indicated by an average decrease of 79.8 percentage points. The VaR associated with 1-year bonds registered the lowest risk and its value fell to 4.3 per cent as at end-2009, relative to 9.2 per cent as at end-2008.

The spread between the Jamaica global bond index and the emerging markets bond Index (EMBI+) increased during 2009. The increase in the spread was associated with downgrades of Jamaica's debt ratings by rating agencies throughout 2009 (see Figure 2.6). Overall, emerging market bond yields have risen sharply throughout 2009 as the effects of the global financial instability spread across emerging market economies. Note however with the execution of the Jamaica Debt Exchange (JDX) on 14 January 2010, the EMBI spread decreased sharply, signaling the positive impact the JDX had on market sentiments towards Jamaican bonds.

2.3 Foreign Exchange Market

The foreign exchange market exhibited some level of instability during the first quarter of 2009. The margin calls that emanated in the December 2008 quarter were still ongoing in the March 2009 quarter.[7] In order to stabilize the market, the BOJ increased the domestic cash reserve requirement on two occasions during the March 2009 quarter. By the start of the June 2009 quarter relative stability returned to the market. There was a decrease in domestic/US interest rate spreads during 2009 due to rate cuts by the BOJ during the year. However, given these policy actions

[7] The ongoing instability was as a result of downgrades of Jamaica's sovereign debt by three major rating agencies as well as illiquid US dollar supply in the market.

during the year, the foreign exchange market continued to display some level of stability (see Figure 2.7). Stability within the market was further facilitated by an informal understanding among authorized dealers to trade within an agreed band. Against the background of these initiatives, the Jamaica Dollar depreciated by 11.3 per cent vis-a-vis the US dollar for 2009, relative to 13.9 per cent in 2008.

The risk of portfolio losses arising from depreciation in the value of the Jamaica Dollar vis-a-vis the three major currencies, as measured by the Amihud Index, was relatively constant for the first three quarters of 2009 (see Figure 2.8). [8] However, there was a sharp decrease of 22.1 percentage points and 21.0 percentage points in the percentile depreciation of the Jamaica Dollar during the last quarter of 2009 against the Canadian dollar and the Pound Sterling, respectively. This indicated some level of instability re-emerging in the market. Liquidity conditions in the foreign exchange market also improved during the last quarter of 2009 and was evidenced by a decrease in the average daily Amihud Index (see Figures 2.9). The Amihud Index decreased to 0.00024 at end-2009 from a high of 0.093 at end-February 2009 (see Figure 2.9). In addition, the cost of doing transactions in the foreign exchange market declined during 2009 as reflected in a trend decrease in the bid-ask spread throughout the year, especially during the last two months of the year 2009 (see Figures 2.7 and 2.9).

The risk appetite in the foreign exchange market increased by 64.5 per cent during 2009 (see Table 2.10 and Box 1.0). The increase was as a result of increased trading in the foreign exchange market relative to the previous year.

2.4 Stock Market

The Jamaica Stock Exchange (JSE) Main Index recorded an increase of 4.0 per cent during 2009 (see Table 2.2). The Amihud Index decreased slightly to 0.34 at end-2009 relative to 0.40 at end-2008, indicating an incremental increase in the level

Figure 2.7 Amihud Return to Volume Indicator & Standard Deviation of Daily J$/US$ Exchange Rate Yields over 252 Trading days

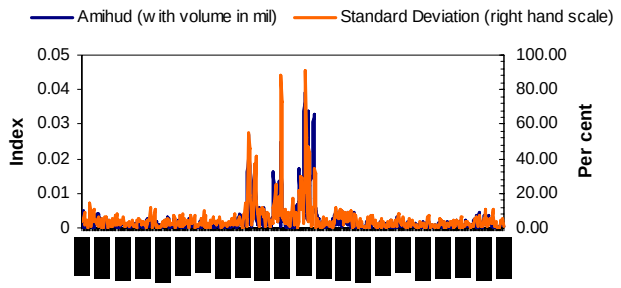


Figure 2.8 99th Percentile Depreciation in Selected Foreign Exchange Rates over Prior 252 Trading Days.

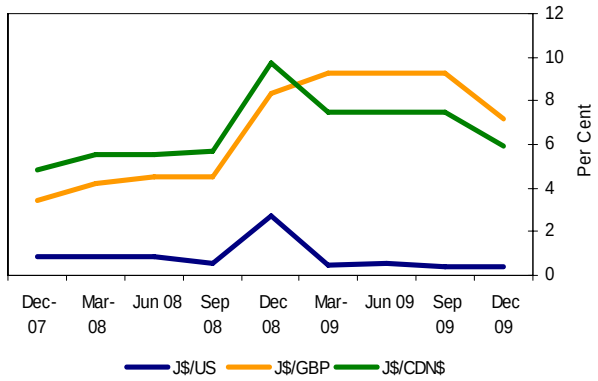
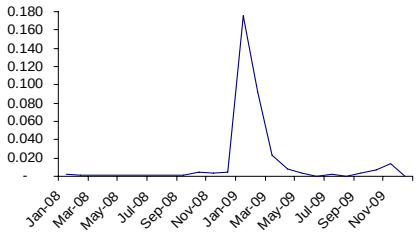


Figure 2.9 Amihud Index of Foreign Exchange Market depth (Average Daily)



[8] The Amihud Index of market depth is measured by the daily change in asset prices divided by the daily level of trading (turnover).

of participation by investors in the equities market (see Figure 2.12). Moreover, the Jamaican stock market showed an overall reduction in the level of volatility in 2009 when compared with 2008.

The Sharpe Ratio for the stock market declined for the first two quarters of 2009, however there was a marked improvement in the ratio for the second half of 2009. The improvement in the ratio was indicative of more favourable conditions for investors in the local equities market during this period (see Table. 2.2). Against this background, there was a dramatic increase of 103.8 per cent in the stock market risk appetite level of investors in 2009 relative to 2008 (see Figure 2.14). The risk of losses on Jamaica's stock market index, as measured by the 10-day VaR outturn, also decreased to 4.3 per cent at end-2009 relative to 10.3 per cent at end-2008 (see Figure 2.13).

2.5 Early Warning System (EWS) [9]

The macro-prudential early warning system (EWS) index for the DTIs continued its trend deterioration in 2009. At end-2009, the index was 2.0 points below the 1996-1998 financial crisis threshold of 44.0 points, indicative of increased vulnerability in the macro-economic environment (see Figure 2.15). Furthermore, at end-2009, the index deteriorated by 9.0 points relative to its value at end-2008. The performance in 2009 can be mainly attributed to the continued decline in GDP and deceleration in private sector credit of 5.7 per cent and 3.4 per cent, respectively. The index was also adversely impacted by increases in the ratios of national and external debt-to-GDP in a context of a rising fiscal deficit and lower revenue collection.

Figure 2.10 F/X Market Investor Risk Appetite

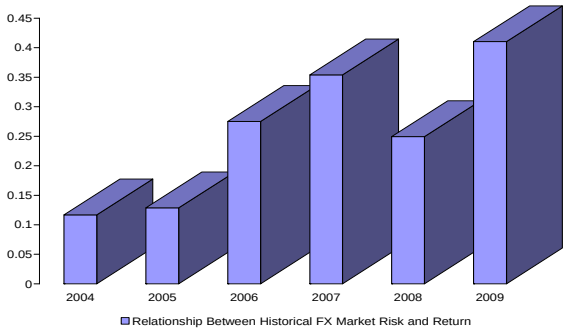


Figure 2.11 Monthly Bid-Ask Spreads & Annual Average daily Volume in J$/US$ Exchange Rate

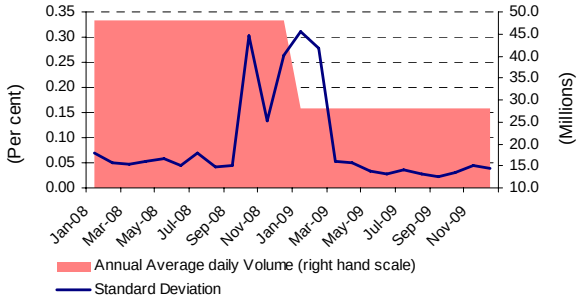
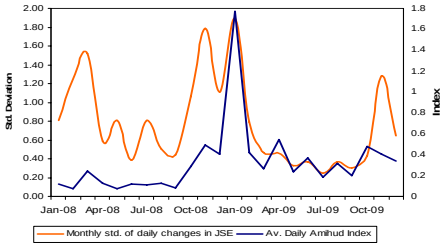


Figure 2.12 Monthly Standard Deviation of Daily Changes in Jamaica Stock Exchange Index



Source: Jamaica Stock Exchange

[9] The BOJ EWS monitors macro- and micro- economic indicators of the banking sector via a non-parametric approach to signal banking sector vulnerability. The signal is based on EWS scores for each indicator, which is computed based on the number of standard deviations of each indicator from its 'tranquil period' mean value. The tranquil period refers to an eight quarter period of relative stability that precedes the beginning of a signalling window. The scores range from 0 to 5 with a score of 5 representing the most severe signal. Banking sector vulnerability at a point in time is determined by the trend in the aggregate EWS score over the previous eight quarters.

Figure 2.13 Distribution of 1-Day Changes in JSE Main Index over 252 trading days to end-2009

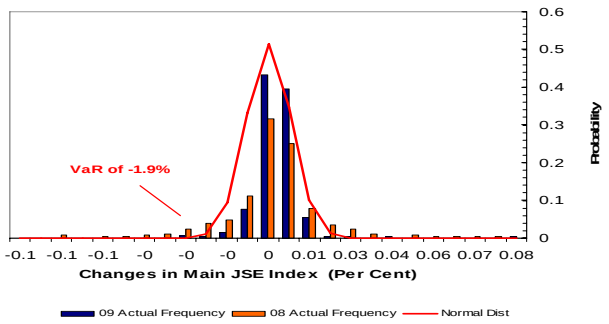


Figure 2.14 Jamaica Stock Market Risk Appetite index

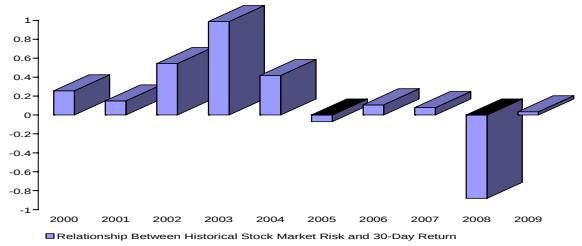


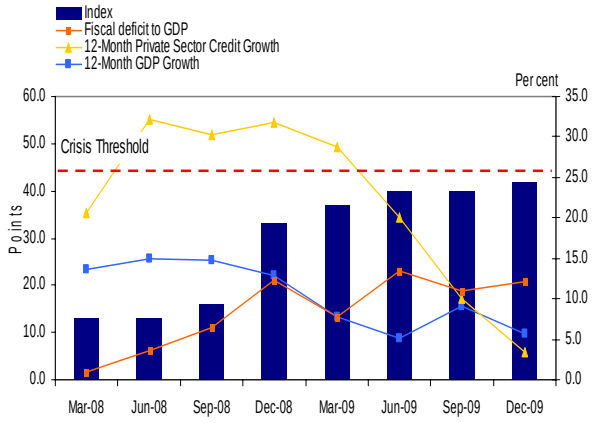
Table 2.2 JSE Performance Measures for 2009

	Dec-08	Mar-09	Jun-09	Sep-09	Dec-09
Annual Change in JSE Main Index PT to PT (Per cent)	-25.8	-26.4	-26.3	-21.7	4.0
Standard Devaiton of JSE Main Inex (annualized)	13.2	17.5	17.8	17.7	13.2
Yield on 1 year GOJ instrument [1/]	25.42	26.00	23.33	18.48	17.35
Sharpe ratio of annulal return	-3.2	-6.1	-6.1	-3.8	-1.6
99th percentile of 10-day loss (Per cent) [2/]	10.1	13.95	6.13	4.86	4.32

[1/] Beginning of period yield

[2/] Change over a 10-day trading period, estimated over the prior 252 trading days

Figure 2.15 Macroprudential Index: 2008 - 2009



Micro-prudential indices (MPIs) for the commercial banks, FIAs and building societies showed mixed overall results for 2009. The MPIs for the commercial banks and building societies declined in severity while the index for the FIA licensees deteriorated. Notwithstanding the deterioration for the FIA licensees, the MPIs for all three sectors remained within the 1996-1999 financial crisis threshold value of 50.0 points. The commercial banking sector continue to record the highest MPI relative to the other sectors. The MPI for the commercial banks declined to 41.0 points at end-2009 relative to 48.0 points for the corresponding period in 2008. This decline was due to improvements in the balance sheet structure, profitability and other financial soundness indicators. In particular, the MPI for commercial banks was influenced by increases of 1.9 per cent, 1.0 per cent and 2.4 per cent in the weighted ratios of capital to assets, deposits and repos to total assets and foreign currency deposits to foreign currency assets, respectively.[10] In addition, a decrease in the weighted ratio of employee salaries to total assets was also a contributory factor to the improvement in the index. Offsetting this improvement were respective increases of 1.3 per cent and 0.4 per cent in the weighted ratios of non-performing loans to total loans and reserve for loan losses to total assets during 2009, signalling increased credit risk (see Figure 2.16).

The MPI for the building societies sector declined to 28.0 points at end-2009 relative to the 30.0 points recorded at the end of last year, primarily as a result of improvements in the balance sheet structure and profitability indicators for these institutions. Influencing this improvement was an increase of 1.7 per cent in both the weighted ratios of deposits to total assets and deposits and repos to total assets. Additionally, a 0.9 per cent decline in the weighted ratio of employees' salaries to total assets aided the strengthening of the MPI for the building societies (see Figure 2.17).

[10] Micoprudential indicators used in the EWS framework are weighted by asset size.

Figure 2.16 Microprudential Index for the Commercial Banks

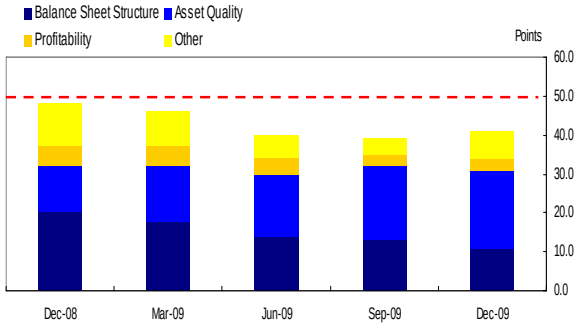


Figure 2.17 Microprudential Index for the Building Societies

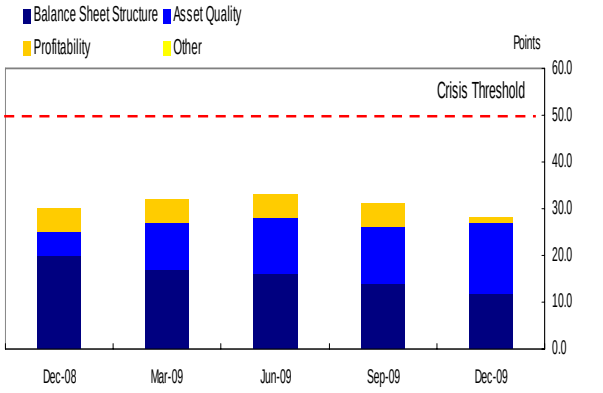


Figure 2.18 Microprudential Index for the FIAs

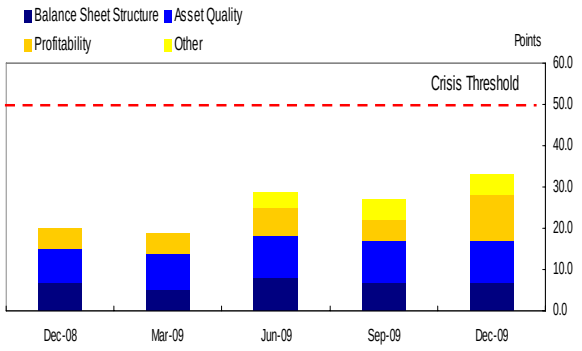
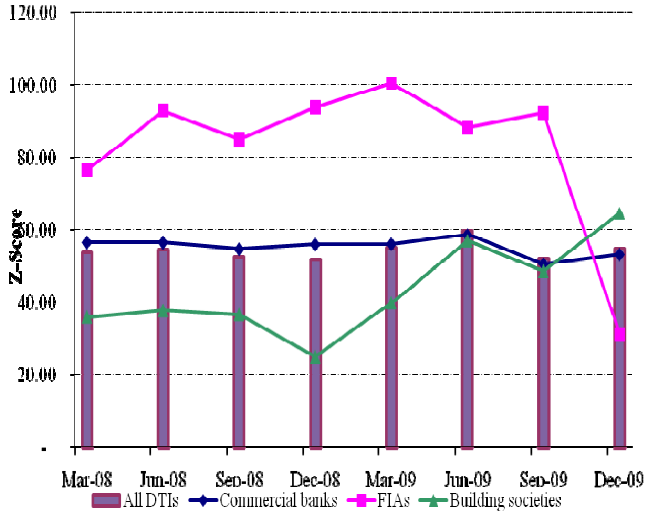


Figure 2.19 Z-Score Index for the Deposit Taking Institutions



Unlike the other two sectors, the MPI for the FIAs increased in severity to 33.0 points at end-2009 in comparison to the 20.0 points recorded at end-2008. The sharp increase in the index was mainly impacted by deterioration in profitability and other financial soundness indicators. Specifically, year-over-year, the weighted ratios of net income to total assets, deposits & repos to total assets and the weighted 12-month growth in deposits declined by 0.5 per cent, 3.4 per cent and 10.1 per cent, respectively (see Figure 2.18).

2.6 Insolvency Risk of Banking Sector

The banking system was less susceptible to the risk of insolvency in 2009, as measured by the Z-score index. The index for the sector increased by 3.0 points during 2009 to close the year at 54.7 points. [11,12] This performance was driven by the

11 The Z-score (insolvency risk) index is used as a measure of a bank's financial soundness. The ratio is calculated as: $z = \frac{ROA + C/A}{STD\,DEV(ROA)}$, where ROA is the bank's return on assets, C/A is its regulatory capital to asset ratio and $\sigma\ ROA$ is its standard deviation of return on assets computed over the sampling period. The Z-score is used to capture the likelihood of a bank's earnings in a given year becoming low enough to eliminate the bank's capital base and thus, the likelihood of the bank becoming insolvent. A higher Z-score implies a lower probability of insolvency.

outturn for building societies. The building societies sector's Z-score, which was more than triple the benchmark of 20.0 at end-2009, stood at 64.8 points relative to 25.0 at end-2008. The increase in the building societies' Z-score occurred in a context of a 0.2 percentage point increase in the return on assets ratio (ROA) to 0.6 per cent, a 0.2 percentage point increase in the capital to assets ratio to 10.5 per cent and a 79.2 per cent decline in the volatility of the ROA to 0.001.

Regarding the commercial banks, the Z-score index for the sector decreased to 53.3 points at end-2009 from 55.9 points at end-2008 (see figure 2.19). The deterioration in the index was mainly attributable to a 37.9 per cent decline in commercial banks' profitability to $3.1 billion at end-2009. This resulted in a 79.6 per cent increase in the volatility of the ROA for 2009.
During 2009, the Z-score for the FIAs declined by 92.6 index points to 31.2 (see figure 2.19). The significant decline in the index for this sector was as a result of the substantial decline in the sectors' profitability during the year. This contributed to a 0.5 percentage point decline in the ROA to -0.2 per cent at end-2009 and a 165.3 per cent increase in the volatility of the ROA in 2009.

2.7 Exposure to Sovereign Debt Default Risk of the Banking Sector

The exposure of the banking system to sovereign debt default increased steadily in recent years as measured by the ratio of holdings of external GOJ debt to capital. At end 2009, this exposure totalled approximately 70.0 per cent, 260.0 per cent and 30.0 per cent for commercial banks, FIAs and building societies, respectively. However, the process of capitalization carried out by financial institutions using own funds helped to strengthen the financial system against sovereign credit risk.

In a context of increased macro-economic instability as well as significant deterioration in the fiscal and debt dynamics in Jamaica, the probability of sovereign debt default increased by 16.3 percentage points to 26.7 per cent at end 2009 relative to the preceding year. At the same time, the banking system attempted to manage their balance sheet exposure to the risk of sovereign debt default by adjusting their ratio of external GOJ debt holdings to capital. Specifically, the ratio of holding of external GOJ debt to capital declined by 7.5 percentage points to 67.5 per cent at end-2009. The building societies sector was least exposed to sovereign GOJ debt which represented 30.5 per cent of the sector's capital base albeit marginal 1.27 percentage points increase over the previous year (see Figure 2.20). Additionally, the merchant banking sector, which had the largest exposure relative to their capital base, also moderated its exposure to sovereign GOJ debt holdings as registered by an 11.5 percentage points decline in the ratio of external GOJ debt to capital to 260.7 per cent.

As measured by the credit loss per exposure (CLPE), the commercial banking sector increased to $12.4 billion representing 16.3 per cent of the sector's capital base at end-2009.[13,14] This represented an 8.8 percentage points year-on-year increase in the exposure at default to capital ratio for the commercial banking sector relative to end-2008. For the building societies, this exposure was estimated at $1.7 billion representing only 7.4 per cent of the building societies sector's capital base. This was, however a 7.1 percentage point increase in the ratio of exposure at default to capital relative to the preceding calendar year. The FIA sector was the most exposed sector, which recorded a 35.8 percentage point increase in the ratio of CLPE to capital to 62.9 per cent at end-2009 (see Figure 2.21).

12 The Z-Scores are weighted based on the relative total assets of the sectors.

13 The credit loss per exposure (CLPE) is a product of the holding of GOJ external holdings by banks, the probability of default (PD) and the loss given default (LGD).

14 The probability of default is estimated using a logit-model which evaluates the likelihood of a debt-rescheduling event contingent of developments in the macro-economic environment based on data from 36 countries between 1986 and 2005.

Figure 2.20 Ratio of Holdings of External GOJ debt by Banking System to Capital

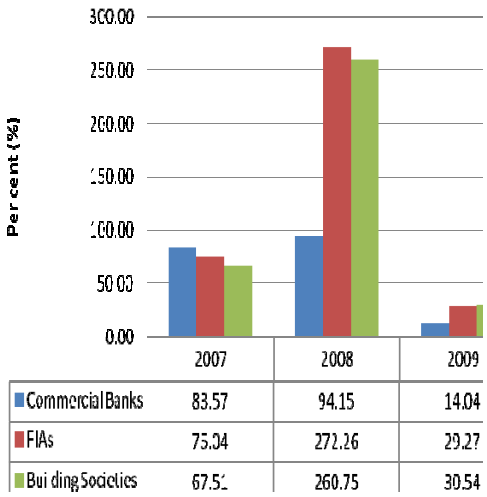
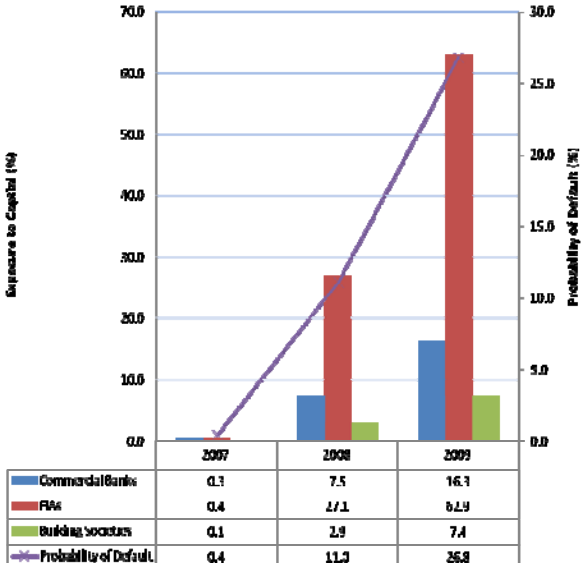


Figure 2.21 Credit Loss per Exposure (CLPE) of the Banking System to Capital and Evolution of Probability of Default



Box 1. Measuring Investors' Risk Appetite

An investor's risk appetite may be defined as the willingness of the investor to bear risk.[15] Various measures have been used to derive an investor's risk appetite. Studies such as Kumar and Persaud (2003) and Misina (2003) have examined and explained some approaches employed in evaluating risk appetite index for investors. There is evidence suggesting that when an investors' risk appetite falls, they require larger expected excess returns to hold risky assets.

Risk appetite shifts periodically as investors respond to instances of market volatility and economic uncertainty. The approach of measuring risk appetite adopted by many risk managers is based on the assumption that the level and development of the risk premium is fundamentally determined by the underlying risk and the risk appetite of investors. An increase in investors' risk appetite *ceteris paribus* shifts demand in favour of riskier assets.

In implementing this approach, the underlying assumption is that the performance of the base asset is a function of the risk to return. Based on this assumption the computation of a risk appetite index is done by regressing the risk measured on the basis of the annualized volatility of the past thirty days on the current performance of the underlying asset. An estimate is incorporated for a change in the issuer of the asset's credit rating, through a variable that incorporates information of rating changes.

The regression therefore takes the form:

$$ER_i = \beta_0 + \beta_1 V_i + \beta_2 R_i + \varepsilon_i$$

Where ER_i refers to the difference between the daily return on the asset and the 180-day OMO rate at the particular period in time. The variable V_i represents the historical volatility of the excess returns of the past 30 days. R_i compares the numerical scaled change in the issuer rating in the period from 60 days before to 30 days after a rating change. The ratings have been ranked in increasing numerical order. Within the next 60 days if there is a downgrade or if it happened in the last 30 days the rating change is negative.

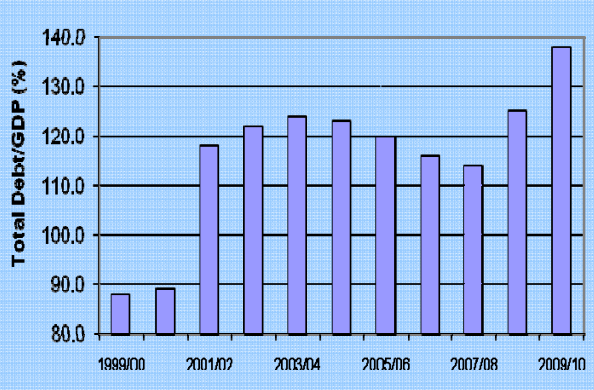
The indicator that measures risk appetite is derived from the coefficient β_1. The β_1 measures the correlation between performance (excess returns) and volatility. A positive coefficient indicates a relatively high risk appetite and the converse also holds true. A rolling window technique is employed so that a β_1 for each month was obtained which represented the monthly risk appetite.

[15] Gai, P. and Vause, N., 2006, Measuring Investor's Risk Appetite, International Journal of Central Banking , 2, 167-188.

Box 2. The Anatomy of a Successful Debt Management Initiative[16]

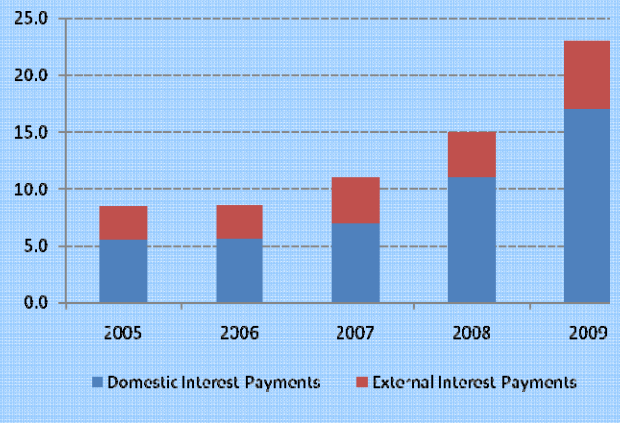
For the greater part of the last two decades Jamaica has suffered from a cycle of low growth and increasingly unsustainable fiscal and debt dynamics. Over the last decade, in particular, real Gross Domestic Product (GDP) growth averaged 1.0 per cent per annum, while the public debt stock remained above 100.0 per cent of GDP (see **Figure 1**).

Figure 1. Total Debt to GDP for Jamaica (1999 – 2009)



In addition to the high debt stock, approximately 40.0 per cent of the domestic debt was maturing in less than two years thus presenting significantly high levels of roll-over risk and leaving the Government of Jamaica (GOJ) vulnerable to sudden adverse shifts in market sentiment. As a direct result, interest payments as a ratio of GDP had tripled over the last 5 years, with interest payments accounting for 23.5 per cent of GDP at end-2009 reflecting an average of 60.0 per cent of GOJ revenues annually. These high and rising levels of debt service costs inhibited investment in infrastructure and other essential services, generated excessive high real and nominal interest rates and catalyzed recurring fiscal slippages. Further, the fiscal dominance caused by the high debt overhang severely constrained the conduct of monetary policy.[17]

Figure 2. Domestic and External Interest Payments to GDP (2005 – 2009)



The Strategic Plan

By the last quarter of 2009, the monetary and fiscal authorities embarked upon a comprehensive policy agenda that would address the fundamental challenges affecting the economy. This initiative was designed to propel Jamaica out of the vicious cycle of high debt servicing costs to a virtuous cycle of lower debt servicing costs, lower roll-over risks, less volatility in domestic prices and sustained growth.

In structuring the transaction, consideration was given to the liquidity impact of alternative proposals as this would have a bearing on the conduct of monetary policy. If bonds were called for example, what would investors do with the unanticipated cash flows?[18] What would be the

[16] Excerpts taken from the speech made by Brian Wynter, Governor of the Bank of Jamaica, at the 31st Meeting of the Latin American Network of Central Banks and Finance Ministries in Washington DC, on 23 April 2010.

[17] In the event of a domestic shock to prices, when public debt is high and the real rate of return on government securities exceeds the economy's growth rate, tightening monetary policy results in higher rather than lower inflation. This is known as 'fiscal dominance of monetary policy.'

[18] Domestic bonds issued by the Government of Jamaica all permitted the government to call the bonds at par with two months' notice.

impact on the foreign exchange market or the balance of payments? How would financial intermediaries respond to the strategy and adjust their portfolios in the context of domestic and global macro-economic uncertainties? In the final analysis, it was determined that proposals such as targeting and calling high coupon debt, for example, would simply not suffice to deal decisively with the increasingly unsustainable debt dynamics. Consequently, a multi-pronged and multi-stakeholder approach would be employed to fine-tune a strategic plan to enable Jamaica to emerge from its precarious position with minimal impact on the stability of the financial sector and the economy as a whole. The stakeholders that would have to be brought to the table would include the non-bank private sector, the financial sector, households, the civil service and several multi-lateral lending agencies.

The strategy was developed after extensive consultations with participants across all market segments to reflect, to the extent practical, the specific constraints and preferences of each specific stakeholder. Furthermore, the GOJ had to ensure that the transaction treated all creditors in a manner that was fair and equitable. In fact, in structuring and executing this complex initiative the most important success factor was to get all major stakeholders to agree on what success would look like. Arising from this consultative process it was decided that all domestic stakeholders would embark upon a comprehensive reprofiling exercise of the domestic debt stock. The initiative was to be dubbed the 'Jamaica Debt Exchange (JDX).'

The broad consensus that emerged was:

1) The transaction had to be large. The domestic debt re-profiling exercise was to be a comprehensive transaction that would address all of the GOJ's domestic publicly traded debt, amounting to J**$700.0 billion** or **65.0 per cent** of GDP.
2) For the transaction to be successful, **100.0 per cent** participation would be necessary to achieve an equitable sharing of the costs arising from the initiative.
3) The transaction would have to achieve significant extension in the debt maturity profile while lowering the interest costs of the GOJ.
4) Finally, and perhaps most importantly to Jamaicans, the transaction would have to maintain the constitutionally mandated obligation of the GOJ to honour its debt obligations. This mandate could be met if and only if:
    a. the transaction was structured as a par-for-par exchange of old GOJ bonds for new GOJ bonds; and
    b. the transaction was 100.0 per cent voluntary with no investor forced into selling their bonds.

Structuring the JDX Transaction

Under the JDX, domestic holders of GOJ debt had the right but not the obligation to select from a menu of fixed, floating, and inflation-linked securities, subject to a set of allocation rules.

A critical deliverable for the central bank was the stability and resilience of the financial system during and after the transaction. This was critical given that the financial system held **65.0 per cent** of the domestic debt. The portfolios of the financial system were carefully stress-tested to evaluate their susceptibility to market risks. In particular, stress

tests sought to ascertain what configuration of debt exchange instruments would lead to marked-to-market losses which could potentially impair the capital base of the financial sector.

It was successfully argued that to the extent that the aforementioned could not be achieved, a fund would be needed that would provide emergency liquidity to institutions which had participated in the transaction. Against this background, a Financial System Support Fund (FSSF) of approximately US$950.0 million was proposed, to be funded by resources from the IMF, the World Bank and the Inter-American Development Bank (IDB). The FSSF would be accessible to participating financial institutions in the event of, for example, a margin call on funds borrowed from overseas institutions arising directly from the debt exchange, a liquidity run on an institution, or problems arising from liquidity mismatches emanating from the transaction.

In terms of structuring the transaction, the Authorities used the JDX transaction as an opportunity to promulgate the deepening and strengthening of the domestic capital market. This was achieved by leveraging the central bank's recent investment in a Central Securities Depository (CSD) as well as the recently implemented Real-Time Gross Settlement (RTGS) system. Specifically, the transaction was customized to allow for the dematerialization of 350 separate paper-based registered bond issues with low levels of liquidity to be replaced by 25 significantly more liquid book-entry securities. The new securities were placed along the maturity spectrum to facilitate the development of a domestic yield curve. The resulting yield curve is reported on a daily basis by Bloomberg and has already enhanced the price discovery process in domestic trading.

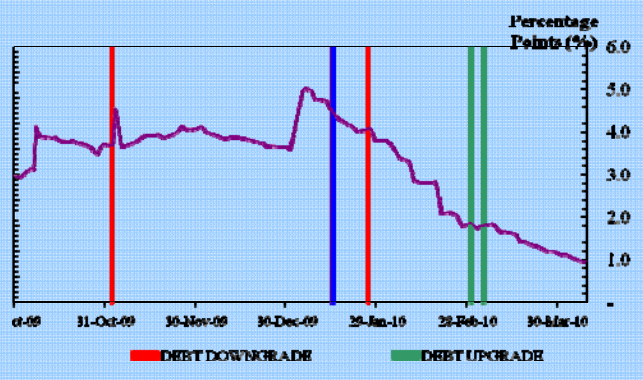
Evaluating the Performance of the JDX

The transaction, which opened on 14 January 2010, closed with a participation rate of 99.2 per cent on 24 February. By the close of the transaction, the debt profile was significantly altered. After the transaction closed the weighted-average maturity of the domestic debt increased by 4.5 years to 9 years. The fixed rate and newly introduced CPI-linked portion of the domestic debt increased to 41.0 per cent from 34.0 per cent. In addition, the average coupon on outstanding domestic debt declined by an average of 650 bps to 12.5 per cent**.** These interest rates were comparable to domestic borrowing costs in the period immediately prior to the financial crisis in the United States and Europe. The estimated annualized interest cost savings for the GOJ is J**$41.0 billion**.

Multi-lateral agencies endorsed this reform agenda with financing of **USD$2.4 billion** over a two year period. This support which came from the IMF, the IDB, and the World Bank not only helped to build confidence in the debt management strategy but also for the medium-term economic programme of Jamaica.

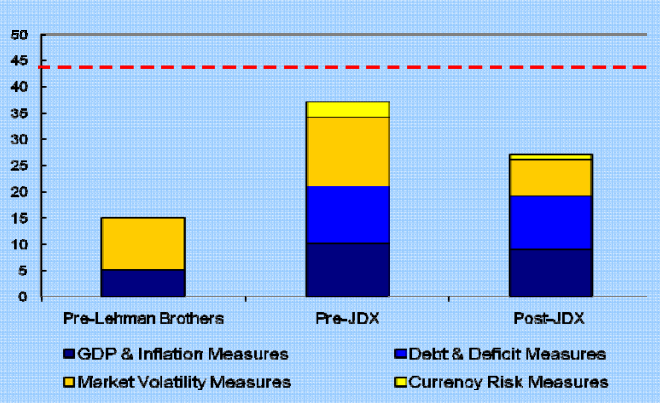
Subsequent to the transaction rating agencies upgraded the ratings on Jamaica's sovereign bonds from Selective Default (**SD**) to grades that were higher than pre-JDX ratings. Furthermore, spreads on GOJ global bonds narrowed significantly post-JDX and the new bonds which were issued as part of the exchange have predominantly traded above par (see **Figure 3**).

Figure 3. The Pre and Post-JDX Evolution of the Spread between GOJ Global bond yields and the Emerging Market Bond Index (EMBI)



There have been significant improvements in the level of volatility in key macro-economic indicators. Bank of Jamaica's macro-prudential index, which synthesizes all the macroeconomic variables into a single indicator, has declined towards the levels obtained prior to the collapse of Lehman Brothers. This is primarily as a result of the marked reduction in the volatility of the exchange rate and the inflation rate as well as significantly reduced exposure to currency risk (see **Figure 4**).

Figure 4. The Macro-Prudential Index (Pre-Lehman Brothers Bankruptcy, Pre-JDX, and Post JDX)



Conclusion

The main lessons emanating from the Jamaican experience in executing a successful debt management initiative are:

(i) a broad consensus on the need for immediate and fundamental change and that all stakeholders have to share in the burden of that particular transformation;

(ii) a stakeholder approach to the broad design of the transaction;

(iii) the transaction itself must be simple, clear, equitable and transparent;

(iv) the proper identification of risks and risk mitigation strategies to address those risks;

(v) careful attention to the design of all elements of the transaction in order to reinforce collective action decisions by the participants; and

(vi) The transaction must be underpinned by a broader programme of reforms that investors can support. The JDX was not conceptualized or communicated simply as a financial transaction but rather as an integral part of Jamaica's strategic economic programme. This economic programme included significant fiscal reforms and supporting policies aimed at the virtual elimination of the fiscal deficit in four years as well as the institutionalization of principles of prudent fiscal management.

3. Global Financial Market

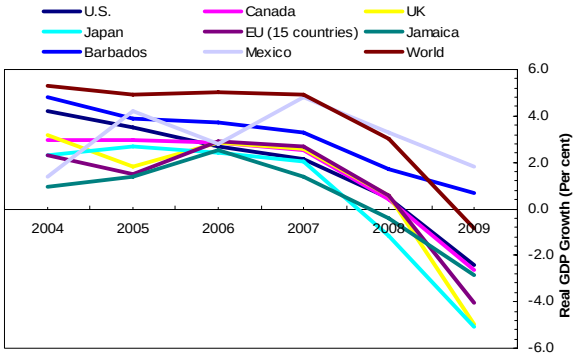
3.1 Overview

During the first half of 2009 conditions in the global financial market remained sluggish due to the ongoing impact of the global financial crisis. However, in the second half of the year there were improvements in key economic indicators. These improvements occurred in a context of the implementation of unprecedented policy measures by central banks and governments in order to revive their respective economies. For 2009, the global economy contracted by 0.8 per cent, representing a deceleration of 3.8 percentage points relative to 2008 (see Figure 3.1). One of the key indicators of global market conditions, the LIBOR spreads, declined during the second half of 2009, after reaching a high in May 2009, suggestive of improvements in liquidity conditions during the latter half of the year (see Figure 3.2). Despite some level of recovery in the global financial markets, important economic indicators such as employment levels remain subdued.

3.2 Impact of the Global Financial Crisis

The uncertainty within the financial markets in 2009 resulted in a number of emerging economies entering loan arrangements with the IMF. This occurred in a context where sovereigns found it increasingly difficult to access funds on the international capital markets, due to the continued high risk aversion of investors throughout most of 2009. There were unprecedented cuts in policy rates by the major industrial countries in order to rejuvenate their ailing economies (see figure 3.3). These rate cuts succeeded in improving the liquidity conditions of the banks and

Figure3.1 Growth Rates of Selected Economies



Source: Bloomberg

Figure3.2 Spreads of 3-month US Libor, 12-month US LIBOR Rates and 3-month GBP Libor and their 1-month counterparts

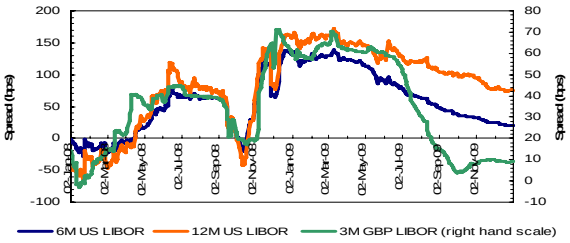
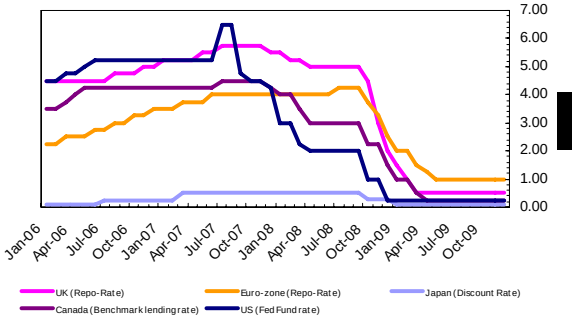
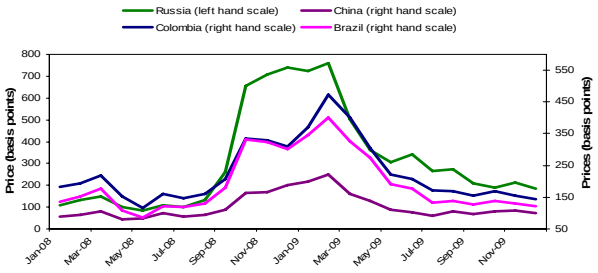


Figure3.3 Policy Rates in Selected Developed Economies



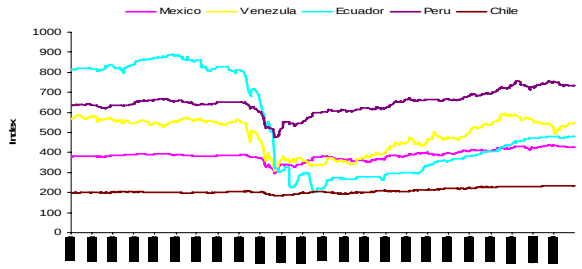
Source: Bloomberg

Figure3.4 5-year Credit Default Swaps



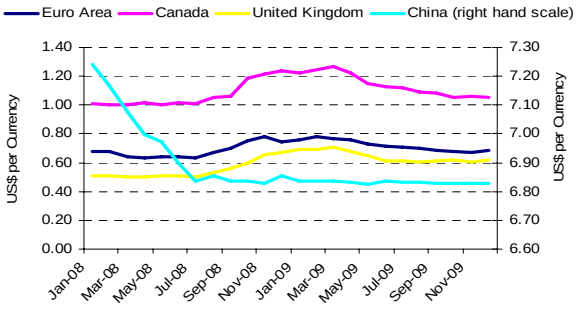
Source: Bloomberg

Figure3.5 EMBI Yields of Selected Countries



Source: Bloomberg Source: Bloomberg

Figure3.6 Selected Major Economy Exchange Rates



bolstering demand. Counterparty risk concerns declined during 2009 as indicated by a dramatic decrease in 5-year credit default swap prices for industrial companies (see Figure 3.4). There was also an increase in liquidity conditions within international markets for 2009. These prices, however, remained above pre-Lehman Brother's levels indicating reduced concerns about counterparty risks.

3.3 Sovereign Instruments

Despite declining sharply during the final quarter of 2008, emerging market bonds' yields increased throughout most of 2009. The trend increase in these yields during the year was indicative of some amount of uncertainty in emerging markets throughout 2009 (see Figure 3.5).

3.4 International Foreign Exchange Market

For 2009, the US dollar depreciated against that of its major trading counterparts. Major currencies appreciated relative to the US dollar for the first quarter of 2009 (see Figure 3.6), due to the ongoing weakening effects of the recession on the US economy. There was a slight depreciation of the US dollar to the middle of the year after which it stabilised against all the major currencies, due to the strengthening of the U.S. economy during the final two quarters of the year

3.5 Commodity Markets & Inflation

After rising dramatically during the 2007-2008 food crises, international food prices have fallen in 2009 (see figure 3.7). [19] Record harvests, weaker demand and lower fuel prices amidst the global recession helped to bring down prices of most agricultural commodities. The export price of wheat, for example, fell from US$481.0 per tonne in March 2008 to US$233.0 per tonne in July 2009. Consumer food prices, however, remained higher in 2009 relative to 2008, as price cuts were not passed on to consumers. Currency volatility, low

[19] The years 2007–2008 saw dramatic increases in world food prices, causing political and economic instability and social unrest in both poor and developed nations. Initial causes of the late 2006 price spikes included droughts in grain-producing nations and rising oil prices.

competitiveness in certain food markets and downward price stickiness contributed to food prices remaining high.

Crude oil prices averaged US$61.79 per barrel (bbl) in 2009, representing a decrease of 37.9 per cent relative to end-2008. The lower oil prices reflected reduced demand for the commodity in 2009 relative to 2008. The fall in price was also reflective of excess supply from OPEC and non-OPEC countries. However, despite the year-over-year decline, there was a trend increase in crude oil prices throughout 2009.

Inflation rates for a select group of developed nations with the exception of the US, declined during 2009. The increase in the inflation rate for the US was in part caused by a 0.4 percent increase in new vehicle prices following the expiration of the popular "cash for clunkers" programme (see Figure 3.8).

3.6 International Stock Markets

There was sluggish performance of the international stock market indices during 2009, influenced by continued uncertainty. After a lackluster start to the year, with falling share prices, the market environment improved with stock prices increasing for the remainder of the year. As such, at the end of 2009, the values of key global indices were in line with the levels recorded at the beginning of 2008 (see Figure 3.9). However the prices at end-2009 were still below those recorded at the beginning of 2008.

Figure3.7 Selected Commodity Prices

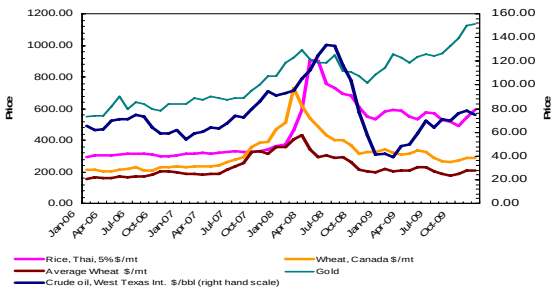
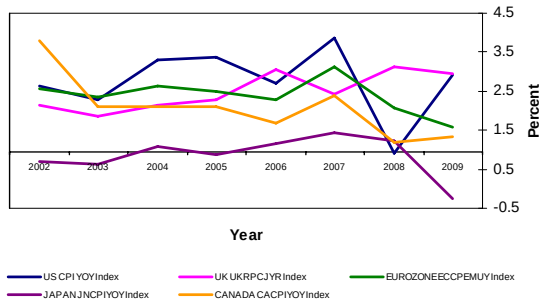
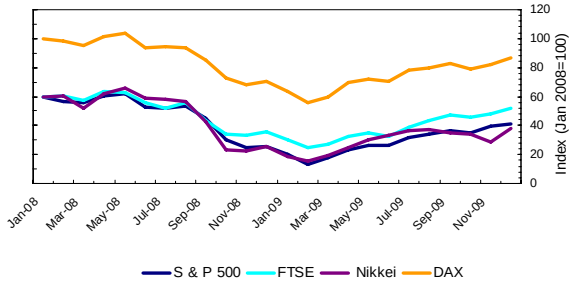


Figure3.8 Inflation Rates for Selected Developed Economies



Source: Bloomberg

Figure3.9 Stock Indices of Selected Developed Economies



Source: Bloomberg

Figure3.10 Regional Stock Exchanges Indices

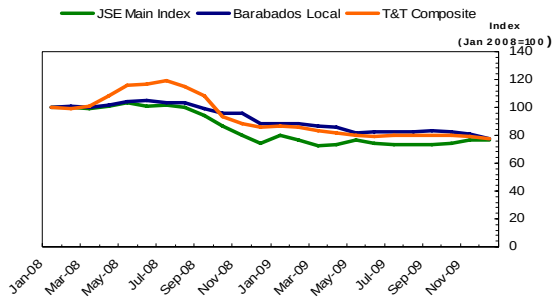


Figure3.11 Distribution of 10-day Changes in BSE Composite Index during 2009

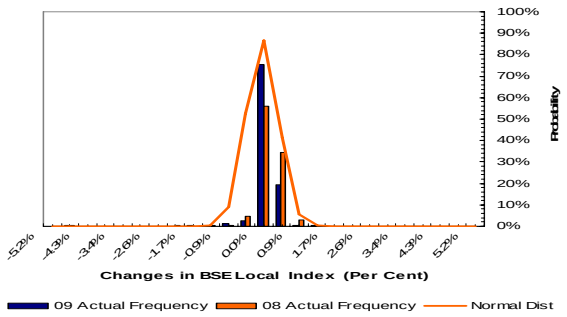


Figure3.12 Distribution of 10-day Changes in TTSE Composite Index during 2009

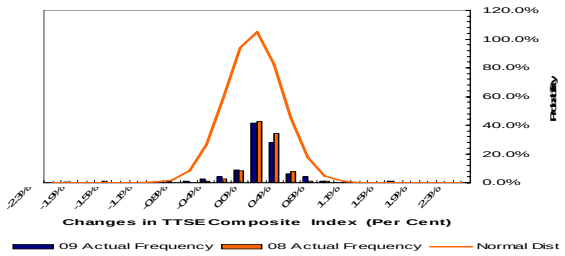
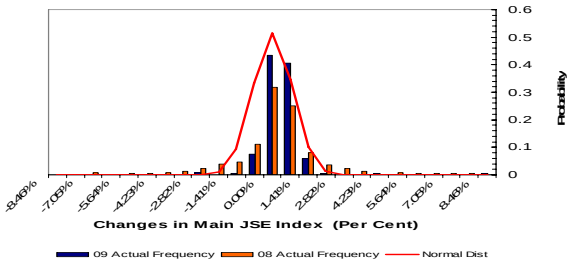


Figure3.13 Distribution of 10-day Changes in JSE Composite Index during 2009



3.7 Regional Stock Markets

The performance of stock markets in the region was relatively lackluster for the majority of calendar year 2009. The Jamaica Stock Exchange (JSE) index ended 2009 with an increase of 4.0 per cent relative to end-2008. The Barbados and Trinidad indices ended 2009 with reductions of 11.9 per cent and 9.2 per cent, respectively, relative to end-2008 (see Figure 3.10).

The weak performance of the Barbados Stock Exchange (BSE) Index during 2009 was due mainly to a slow down in economic activity in that country due to the impact of the global economic recession. The underperformance of the Trinidad and Tobago Stock Exchange (TTSE) was due in part to the Clico and CL Financial implosion and the subsequent Government "bail out" which had a negative impact on the Trinidadian economy.

The 10-day VaR at the 1.0 per cent level indicates that the JSE recorded a VaR of 1.4 per cent while the BSE and the TTSE indices recorded VaRs of 3.1 per cent. These outturns were lower relative to the VaR for the JSE Index of 5.9 per cent at end-2009 (see Figure 3.11 and Figure3.13).

4. Financial System Developments

4.1 Overview

The domestic financial sector adapted very well to the economic climate in 2009 and reported robust financial indicators. However, there was lower growth in the asset base of financial institutions, which had been declining since 2008. Against this background, there was a slight weakening in the depth of financial intermediation in Jamaica during 2009, as measured by the ratio of total financial institutions assets as a share of GDP. The ratio declined to 139.0 per cent at end-2009 relative to 140.0 per cent at the close of the previous year (see Figure 4.1). The reduction was largely due to the fall off in loans extended by the banking system to non-financial corporations. This in turn resulted in a reduction in net profits during the year 2009, in spite of interest rates being relatively high during 2009 in a context of weak domestic demand. There were noticeable changes in the structure of the financial system over the period of 2007 to 2009. In particular, banks, insurance companies, building societies, credit unions and securities dealers increased their share in the financial sector's total assets at the expense of the FIAs (see Figure 4.2). With their share of 69.5 per cent, commercial banks remain the dominant sector. Financial soundness indicators signalled improved balance sheet strength over the review period. Given the resilience of the domestic financial sector during 2009, future developments in the financial sector will depend on what happens in the real economy and financial markets abroad. However, the domestic financial sector is currently relatively resilient to the risks identified.

4.2 Performance of Deposit-Taking Institutions

The total assets of the banking sector remained relatively stable at just over J$800.0 billion during 2009. Having previously increased significantly, the credit portfolio remained flat due to weak economic output, declining demand for loans, particularly in the corporate sector, and high interest rates being charged by local banks. Renewed growth in loans in the near future will depend on the rate of economic recovery, monetary and fiscal policies, the setting of credit conditions by banks which include the lowering of retail loan rates and provision

Figure 4.1 Depth of Financial Intermediation
(assets of financial corporations as % of GDP)

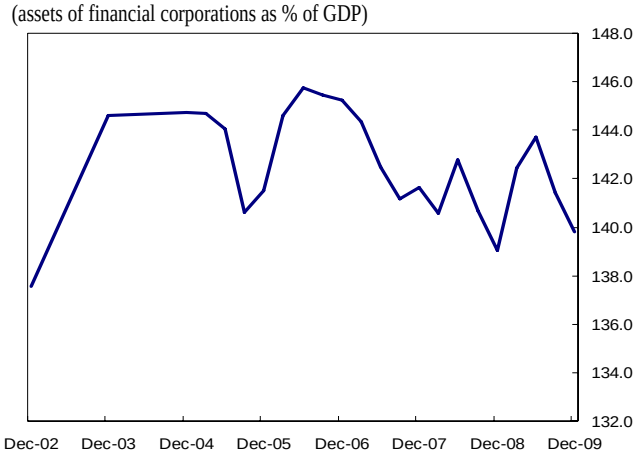


Figure 4.2 Growth in Shares in Financial Sector Assets over the last two years
(per cent; growth between end-2009 and end-2007)

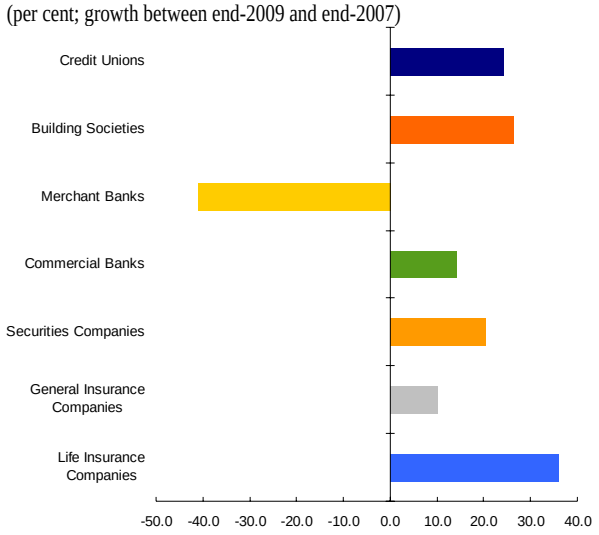


Figure 4.3 DTI's Aggregate Balance Sheet as end-2008 and as at end-2009

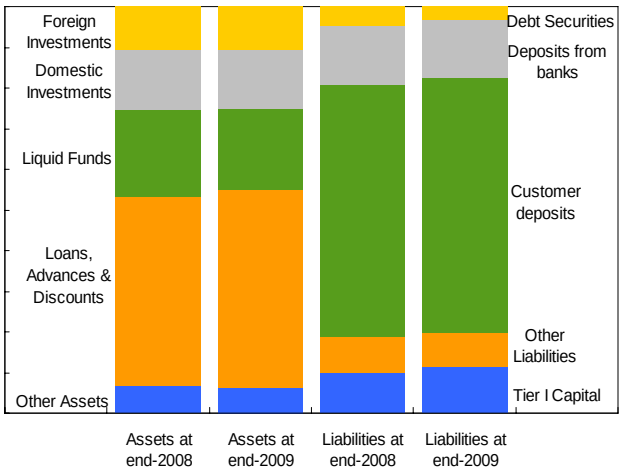


Figure 4.4 Comparative Asset Base of DTIs

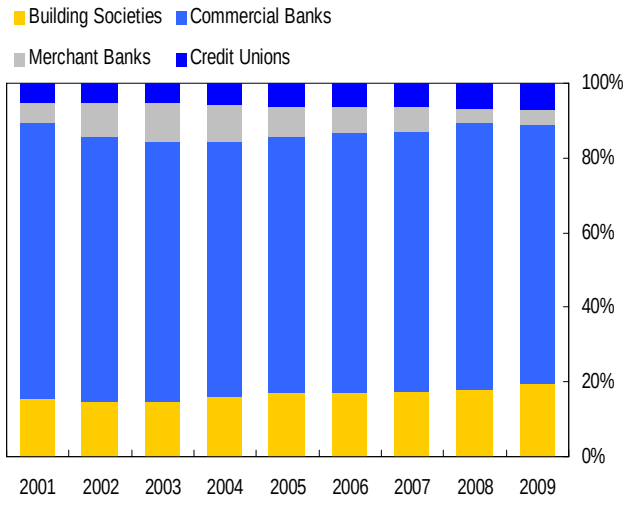


Figure 4.5 DTI's Assets Composition as a Share of Total Assets as at end-2009

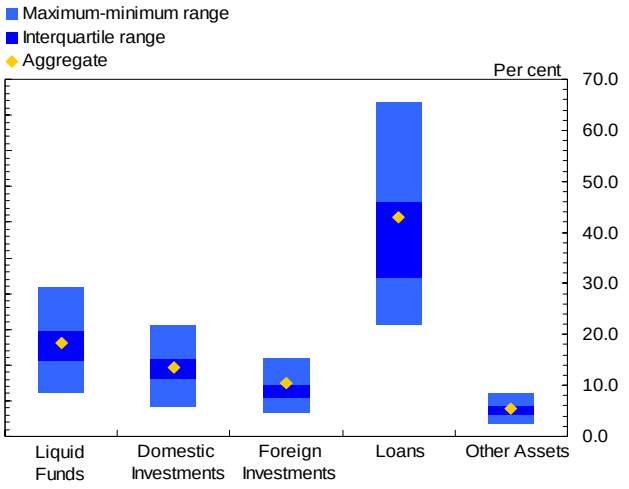
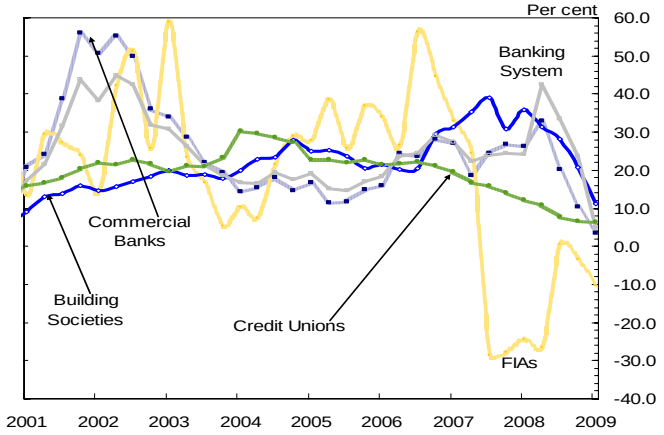


Figure 4.6 Annual Growth in DTI Lending to Jamaican Private Non-financial Corporations



for loan losses as a buffer for any future losses that may arise

The asset base of DTIs increased by 9.3 per cent in 2009 relative to 14.8 per cent growth recorded in 2008 (see Figure 4.3). All DTIs recorded growth in market share with the exception of the FIA sub-sector, which had a 41.1 per cent decline in its market share (see Figure 4.4). The growth in total assets in 2009 was largely driven by building societies and credit unions which recorded an increase of 26.4 per cent and 24.3 per cent, relative to respective amounts of 12.6 per cent and 14.5 per cent in 2008.

4.2.1 DTI's Asset Positions

The fall off in growth in total assets in 2009 was largely due to the slower rate at which banks were able to extend credit during the review period. Notwithstanding, *Loans, Advances and Discounts* still comprised the majority of DTIs' asset base, totalling 48.0 per cent at end-2009, relative to 44.0 per cent at end-2008 (see Figure 4.5). Institutions loan portfolio ranged between 20.0 per cent and 65.0 per cent of total assets for the review period, with the FIAs being at the lower end of the range (see Figure 4.6).

The decline in banking sector credit was due to the performance of the corporate, household and *Other* economic sectors. Credit to corporate sector contracted by 41.5 per cent in 2009 relative to growth of approximately 33.9 per cent in 2008. Total credit to *Other* economic sectors declined by 1.7 per cent in 2009 compared to a five year average growth of approximately 66.3 per cent. The growth in credit to the household sector decelerated by 18.7 percentage points to 2.3 per cent at end-2009.

The fall off in credit growth to these private non-financial corporations and households reflected the impact of the slowdown in the domestic economy, which was manifested in weak private sector demand for credit coupled with the high cost of borrowing in 2009.[20] The contraction in the growth in

[20]Private non-financial corporations consists of all non-financial corporations and quasi-corporations that are not controlled by government or by non-resident institutional units

corporate sector credit was reflected in the reductions in credit extended to *Mining, Manufacturing, Construction, Transport* and *Tourism* which declined by 95.6 per cent, 94.5 per cent, 76.9 per cent, 97.8 per cent and 3.6 per cent during the year. This compares to annual growth of 42.9 per cent, 41.3 per cent, 25.5 per cent, 31.8 per cent and 35.3 per cent in the respective sectors at end-2008. Demand for corporate sector products continued to be subdued in 2009 by a weak global and domestic macro-environment. Conversely, *Agriculture*, continued to record robust growth (19.4 per cent at end-2009) which partially offset the reductions in corporate sector credit.

Consumption which continues to dominate the share of private sector credit (65.2 per cent) grew by a marginal 2.3 per cent in 2009 compared to 20.9 per cent in 2008. This was largely due to declines in *Distribution* and *Professional Services* to 9.5 and 12.6 per cent, respectively, relative to 18.9 per cent and 38.0 per cent at end-2008. At the same time, *Personal Loans* contracted by 0.2 per cent relative to growth of 19.3 per cent in 2008.

Credit to *Other* declined as a result of the reduction in credit to *Overseas Residents* which contracted by 11.6 per cent relative to growth of approximately 135.5 per cent in 2008. Offsetting some of the reduction in *Other* was the respectable growth in electricity and entertainment by 37.5 per cent and 25.7 per cent, respectively relative to 47.2 per cent and 17.1 per cent in 2008.

The stock of security investments by the banking system increased marginally to J$195.6 billion at end-2009, relative to J$195.7 billion at end-2008. Weak domestic demand for credit in 2009, however, did not stop DTIs from continuing to

Figure 4.7 DTI's Stock of Lending to Private Non-Financial Corporations

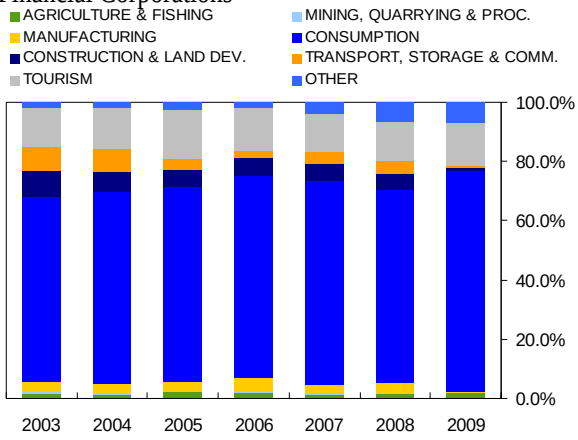


Figure 4.8 DTIs Funding Sources as a Share of Total Liabilities as at end-2009

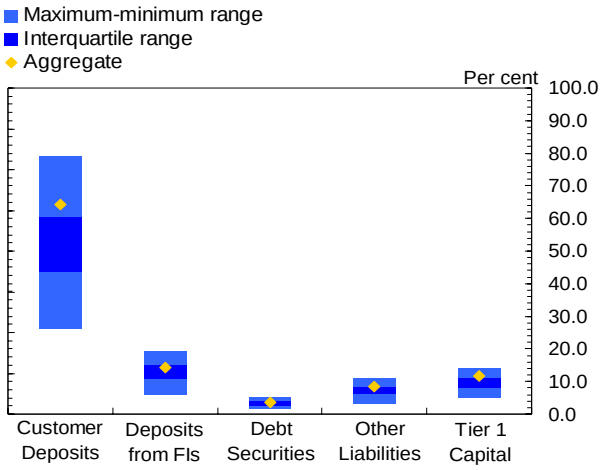


Figure 4.9 DTIs Liability Structure

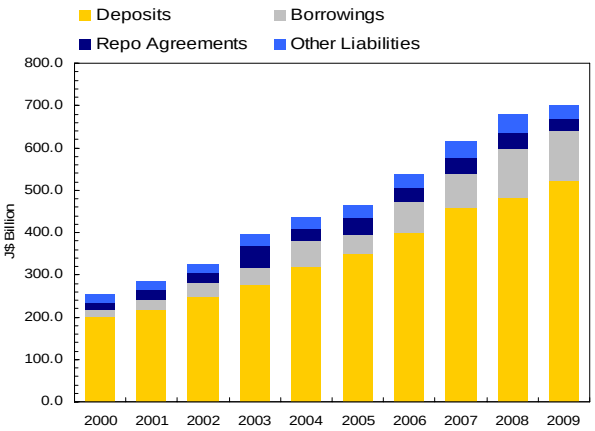


Figure 4.10 Growth in DTI's Liabilities

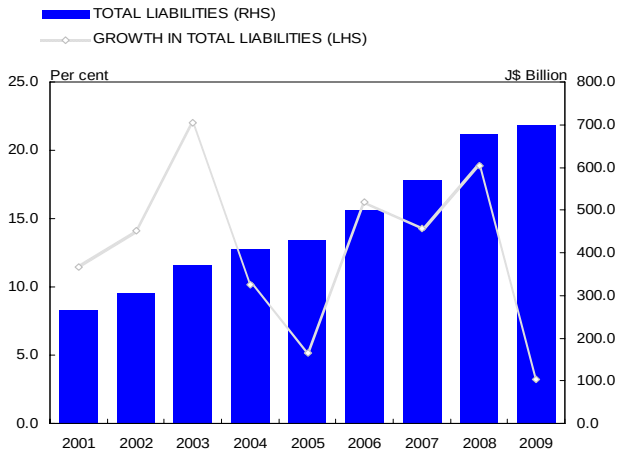


Figure 4.11 DTIs Net Profit Trend

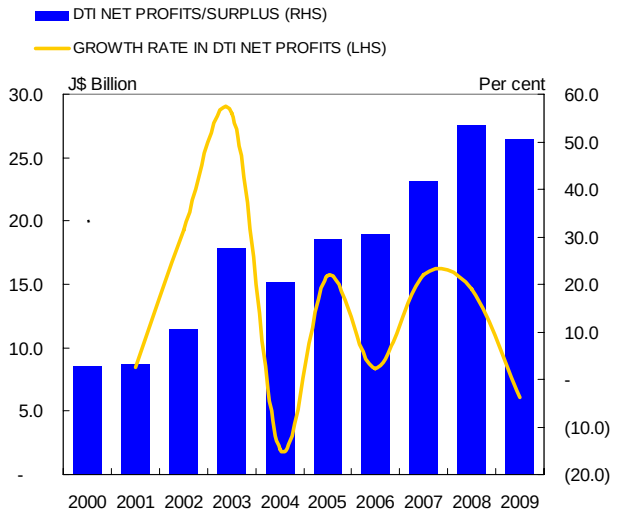
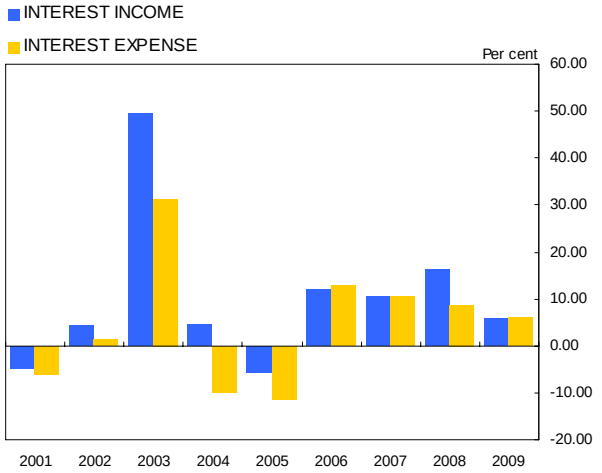


Figure 4.12 Growth in DTI's Interest Income & Expense



realign their asset portfolios. This was evidenced in the slower pace of growth in investment assets of 1.5 per cent relative 4.9 per cent in loans at end-2009. At end-2009, investments accounted for 24.4 per cent of total assets, while gross loans as a proportion of total assets was 47.5 per cent (see Figure 4.5).

DTIs' liquid assets accounted for approximately 20.0 per cent of total assets at end-2009, reflecting an adequate share of liquid funds (see Figure 4.5). Despite the banking sector reporting strong liquidity positions, aside from the commercial banks, liquidity outturn for the other sectors i.e. FIAs, building societies and credit unions were significantly lower at 0.2 per cent, 3.2 per cent and 1.0 per cent, relative to respective amounts of 0.2 per cent, 3.7 per cent and 5.8 per cent in 2008. The concentration of liquidity in the commercial banking sector was a direct result of commercial banks accounting for the significant share of banking sector deposits.

4.2.2 DTIs Liability Positions

DTIs stock of liabilities at end-2009 increased to J$700.1 billion. This growth of approximately 3.2 per cent for the review period is relative to growth of approximately 10.3 per cent in the stock of liabilities in 2008. The slower growth in DTIs liabilities in 2009, reflects a reduction in *Borrowings, Repo* and *Other* to J$116.6 billion, J$29.4 billion and J$29.9 billion, respectively from J$118.7 billion, J$35.4 billion and J$42.8 billion in 2008 (see Figure 4.9).

The reduction in these non-traditional sources of financing such as borrowing and other liabilities in 2009 reflect efforts by the banking system to limit exposure following the second stage of the financial crises in 2008 and to return to more conservative banking measures.

Notwithstanding, deposits which accounts for bulk of the banking systems liabilities grew by a credible 8.9 per cent in 2009 from 5.3 per cent in 2008. At end-2009, deposits accounted for J$524.3 billion or 74.8 per cent of total liabilities relative to 71.0 per cent at end-2008. The increase in the ratio of

deposits to total liabilities in 2006 occurred in the context of a decline in borrowings and repo liabilities as a source of financing. The growth in deposits was driven primarily by the growth in foreign currency deposits during 2009 by 15.9 per cent relative to 3.0 per cent in 2008. By extension, at end-2009 domestic currency deposits grew by 5.1 per cent to J$326.5 billion relative to J$310.7 billion or growth of approximately 6.6 per cent in 2008. The faster rate of growth in foreign currency deposits relative to domestic currency deposits in 2009 was due to increased uncertainty surrounding the domestic economy amidst the global recession resulting from the crisis.

The commercial banks continued to account for the bulk of DTIs' stock of deposits at end-2008. Commercial banks' deposits totalled $351.1 billion at end-2009 and represented 68.1 per cent of system deposits compared to a ratio of 70.1 per cent at end-2008. FIAs, building societies and credit union deposits totalled $13.0 billion, $110.1 billion and $44.0 billion, respectively, and accounted for 2.5 per cent, 21.0 per cent and 8.4 per cent of system deposits at end-2009.

4.2.3 DTIs Earnings and Profitability

DTIs Net profits for 2009 amounted to J$26.5 billion relative to J$27.6 billion recorded at end-2008. This translated into a decline in net profits for 2009 and compared unfavourably to the 18.9 per cent growth recorded in 2008 (see Figure 4.11). The reduction was largely due to the fall off in net interest income in 2009 resulting from weak household demand for credit and high cost of borrowing during the year (see Figure 4.12). There were also noticeable reductions in DTIs' non-interest income as a result of a decline of 1.6 per cent in income from S*ervice Charges, Ttransaction Fees and Commissions* relative to growth of 16.2 per cent in 2008 (see Figure 4.13). *Other Income* also contracted by 50.0 per cent during 2009 compared to growth of 58.0 per cent in 2008. DTIs' net profit was also negatively affected by substantial increases in expenses emanating from staff costs and provision for loan and security losses.

Figure 4.13 Growth in DTIs Net Interest Income

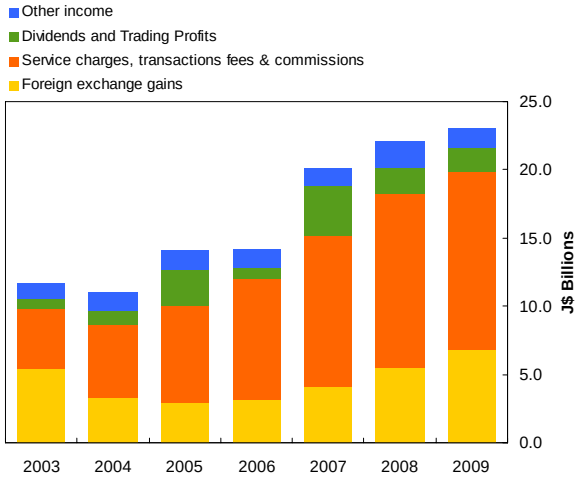


Figure 4.14 DTIs Loan – Deposit Spread

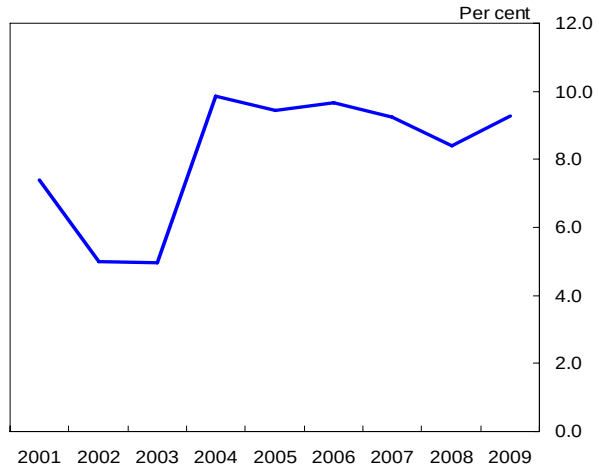


Figure 4.15 DTIs Net Interest Margin

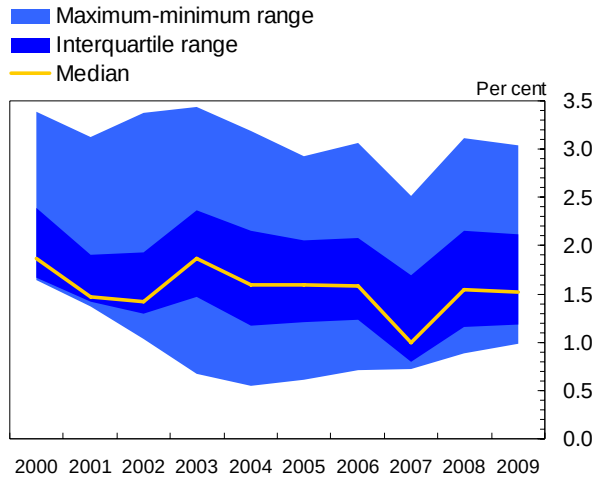


Figure 4.16 DTIs Annual Return on Assets (ROA)

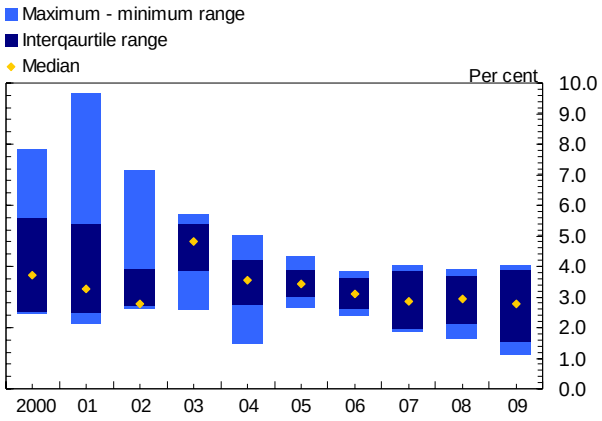


Figure 4.17 Trend in and Decomposition of Return on Equities (ROE) for DTIs

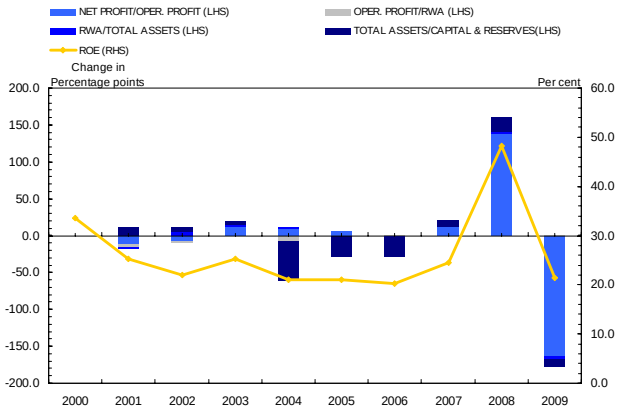
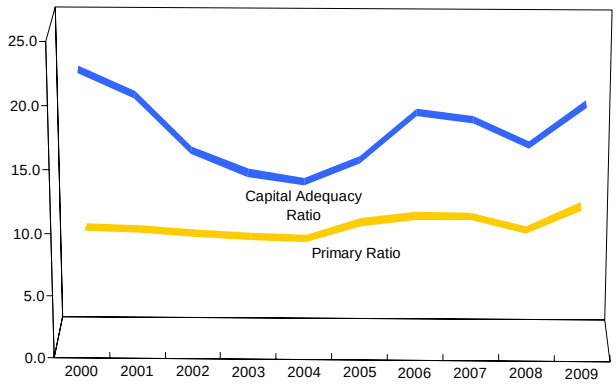


Figure 4.18 Trends in DTIs Capital Adequacy and Primary Ratios



For 2009 DTIs' loan-to-deposit interest rate spread increased to 9.3 per cent from 8.4 per cent in the previous year largely due to the maintenance of relatively high loan rates for much of the period (see Figure 4.14). The growth in the spread was reflective of an increase in the weighted average loan rate for the first half of 2009. On the contrary, deposit rates remained relatively flat for most of 2009.

Interest income declined across all DTI sectors during 2009 (see Figure 4.13). Commercial banks' interest income fell by 5.4 per cent from growth of 24.0 per cent recorded in 2008. Similarly the interest income of the FIA licensees declined by 7.8 per cent in 2009, compared to growth of 6.1 per cent in 2008. Building societies and credit unions recorded growth in net interest income of 12.7 per cent and 10.3 per cent, respectively during 2009, relative to respective, growth rates of 5.0 per cent and 17.7 per cent during 2008.

The increase in average earning assets during 2009 contributed to the net interest margin declining to 1.5 per cent for the year from 1.6 per cent during 2008 (see Figure 4.15). The reduction in the DTIs' net profits contributed to declines in the key profitability measures during the year, particularly the return on assets (ROA). The decline in ROA was driven primarily by the reduction in yields on earning assets to 3.9 per cent during 2009 compared with an increase of 4.4 per cent during 2008 (see Figure 4.16).

Similar to the ROA, there was a decline in the ROE of the DTIs during 2009. The ROE declined to 21.3 per cent at end-2009 compared to 48.2 per cent at end-2008. The decline in the ROE during the period largely reflected reduced profit margins in commercial banking sector, which declined by 11.8 percentage points to 11.1 per cent for 2009 (see Figure 4.17).

In the five years prior to 2009, ROE was driven primarily by changes in leverage. However, in the last two years changes the sectors ROE were influenced largely by the pre-tax profit margins of these institutions. In light of expected changes in 2010 amidst the expected launch of the JDX which is expected

to reduce interest income on domestic GOJ securities, the sectors' ability to generate profits and capital could become more challenging.

4.2.4 Capital and Solvency

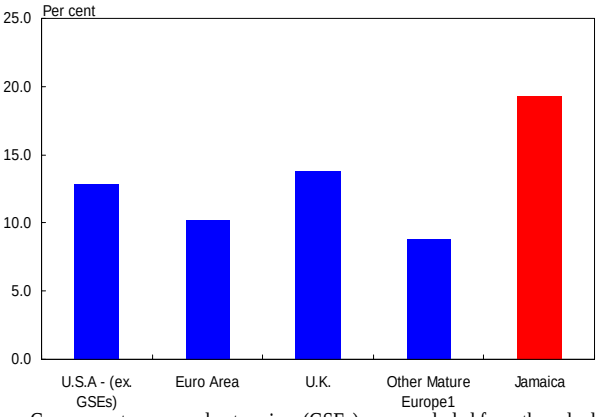
All banks reported capital adequacy ratios (CARs) significantly above the local 10.0 per cent prudential benchmark at end-2009 (see Figure 4.18).

The primary ratio increased to 10.1 per cent at end-2009 relative to 8.2 per cent at end-2008, while the CAR increased to 24.2 per cent at end 2009 relative to 16.4 per cent at the end of the previous year. The total CAR of Jamaica's banking sector was above US and European averages in 2009 (see Figure 4.19). Retained earnings remained the largest component of Tier 1 capital. Furthermore, at end-2009, ordinary shares accounted for approximately 20.0 per cent of regulatory capital (see Figure 4.20). In addition, retained earnings and ordinary shares as a percentage of regulatory capital increased in 2009 largely due to fall off in share premium during the review period.

In 2009, risk weighted assets (RWA) grew by 11.6 per cent, relative to 8.2 per cent in 2008. The growth in RWA was driven primarily by the growth in interbank lending, loans and fixed assets of 64.7 per cent, 6.7 per cent and 6.5 per cent, respectively, relative to -89.3 per cent, 15.4 per cent and 11.8 per cent at end-2008.

In spite of stronger growth in DTIs' RWA in 2009 relative to 2008, DTIs continued to record robust performance in their capital adequacy ratios at the end of the review period. This occurred in a context where DTIs' capital accumulation remained strong during the year, as evidenced by robust growth in capital of 31.3 per cent during 2009 relative to a decline of 3.3 per cent in 2008.

Figure 4.19 Regulatory Capital
(tier 1 capital/rwa ratios at end 2009)



Government-sponsored enterprises (GSEs) were excluded from the calculation of capital adequacy ratio for the U.S.A.

[1] Denmark, Iceland, Norway, Sweden, and Switzerland.

Figure 4.20 Structure of Regulatory Capital

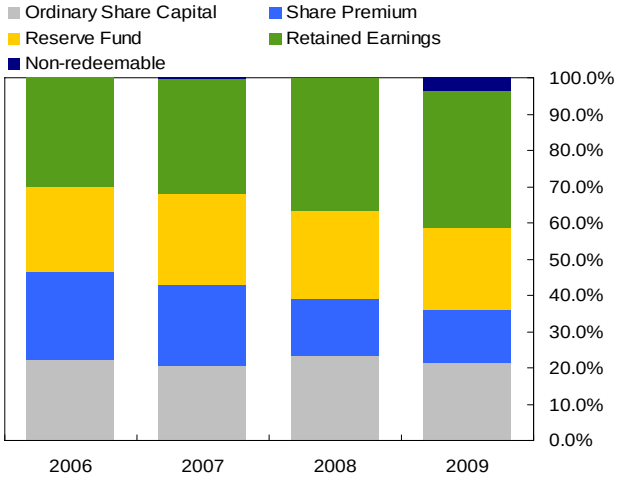


Figure 4.21 DTIs Total Assets and Risk-Weighted Assets

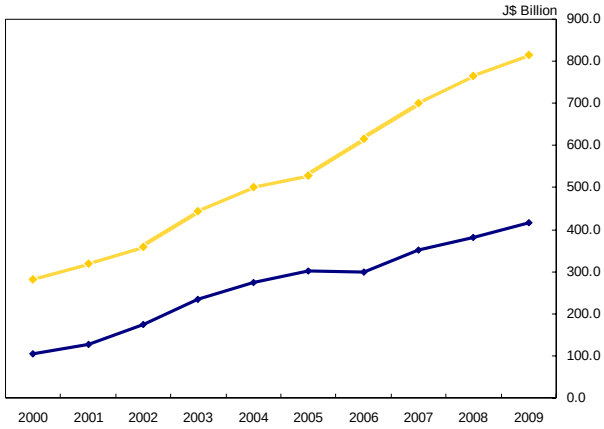


Figure 4.22 Number of NBFIs in Jamaica

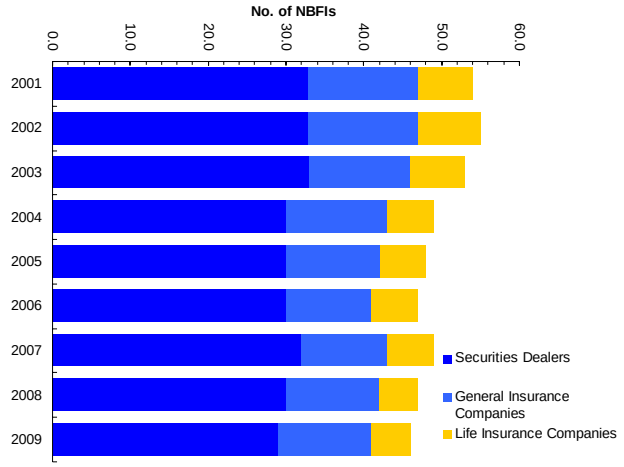


Figure 4.23 Asset Base of NBFIs at end-2008

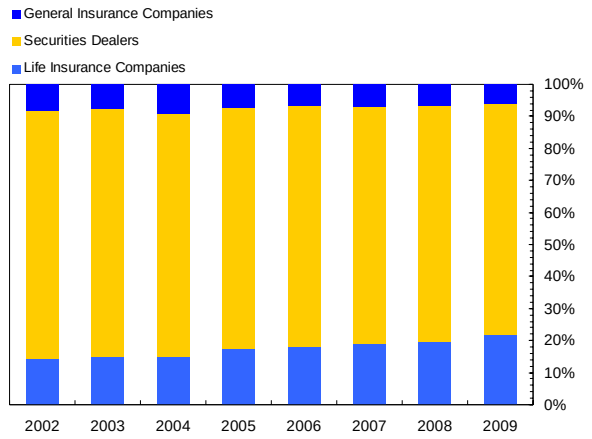
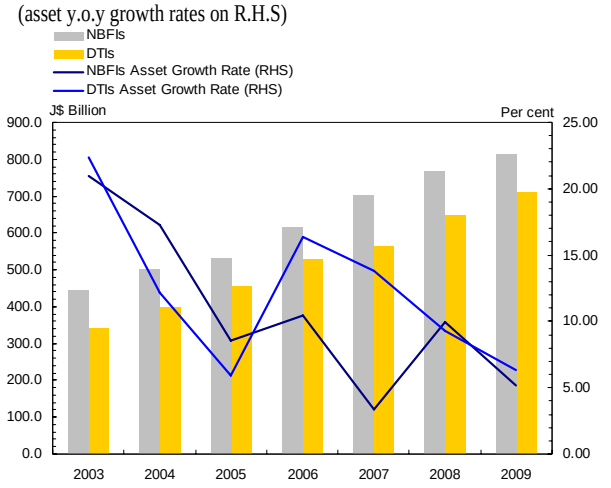


Figure 4.24 Comparative Asset Base of DTIs and NBFIs
(asset y.o.y growth rates on R.H.S)



4.3 Non-Bank Financial Institutions

In 2009, the number of non-bank financial institutions (NBFIs) declined to 46 from 49 the previous year. Despite the decline in the number of NBFIs, the depth of their intermediation in the domestic economy continued to increase at end-during 2009. This was reflected in an average growth of 11.4 per cent in NBFIs assets during 2009 to approximately $710.7 billion relative to growth of 13.9 per cent during 2008.

4.3.1 Securities Dealers

The expansion in the asset base of the securities dealers slowed to J$512.5 billion at end-2009 relative to J$478.6 billion at end-2008, despite a strong increase in assets during the first quarter of the year. GOJ securities continued to account for the largest share of total assets, amounting to 58.0 per cent at the end of the review period (see Figure 4.24). However, this ratio represented a year-on-year decline of 1.2 percentage points.

Despite relatively good returns on GOJ instruments, securities firms have continued to diversify their funds under management (FUM) portfolio to include more complex financial products that also offer attractive returns (see Figure 4.25). The steady expansion in other securities as a share of FUM continued its gradual increase in 2009 to 29.2 per cent relative to 28.2 per cent at end 2008. GOJ and BOJ securities as a share of securities FUM amounted to 57.5 per cent and 10.7 per cent respectively, marginally below the 58.7 per cent and 11.0 per cent recorded in 2008.

Securities dealers were very liquid during 2009 as evidenced by an average liquid asset to current liabilities ratio of 104.5 per cent at the close of the review period (see Figure 4.26). The strong liquidity position of the securities dealers was influenced by their significant holdings of BOJ and GOJ securities as a large proportion of these investments could be classified as liquid assets. The liquidity ratios of the securities dealers at the end of the review period were significantly above banking counterparts which reported average liquidity in 2009 of approximately 20.0 per cent.

The profits of securities dealers declined during 2009, in particular the June and September 2009 quarters where the maximum ROA fell to 4.2 per cent in September 2009 from 7.8 per cent in 2009, while the minimum ROA declined to 0.2 per cent and 1.9 per cent in June and September 2009 respectively. Consequently the median ROA fell to 2.7 per cent in December 2009 from 3.3 per cent in March 2009 (see Figure 4.27).

Securities dealers' capital adequacy ratios at end-2009 were significantly above the prudential benchmark of 10.0 per cent. This was a direct consequence of GOJ and BOJ securities accounting for in excess of 60.0 per cent of securities dealers' assets while carrying zero per cent risk weights. After 2009, foreign currency GOJ securities will no longer attract a zero per cent risk weight. This has occurred in the context of the JDX programme launched on 10 February 2010 in which existing Jamaican Dollar Debt were exchanged for 25 new Jamaica dollar debt with longer maturity and lower interest rates (see Box 2.0).

Tier 1 and Tier II capital to total assets totalled 8.8 per cent in mid-2009 and 10.1 per cent at end-2009 (see Figure 4.27). Despite being marginally above the prudential minimum of 10.0 per cent the increase in the primary ratio reflects efforts by securities dealers to strengthen their capital positions.

The improvement in capitalization in 2009 was due to growth in regulatory capital of 27.9 per cent.

Figure 4.25 Decomposition of Securities Dealers FUM

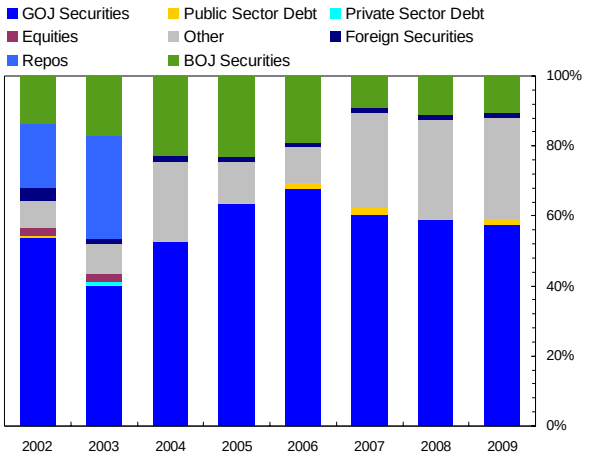


Figure 4.26 Securities Companies Liquidity Condition

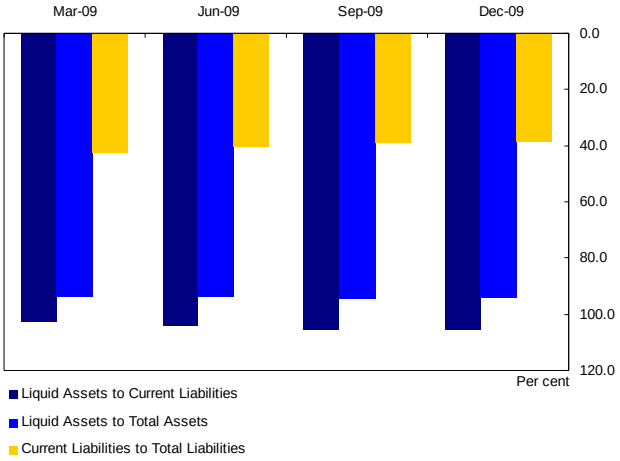


Figure 4.27 Return on Assets of the Securities Dealers

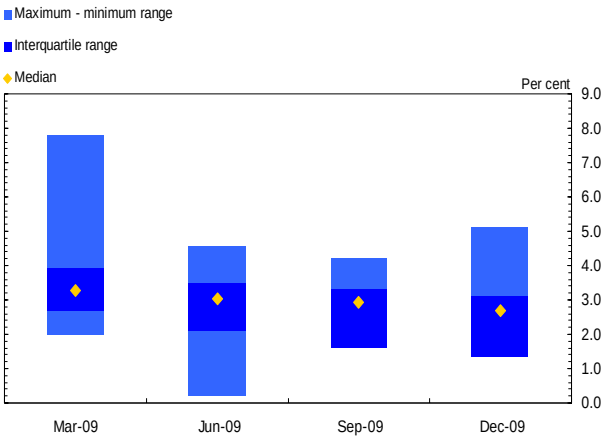


Figure 4.27 Capital Adequacy and Primary ratios of Securities Dealers

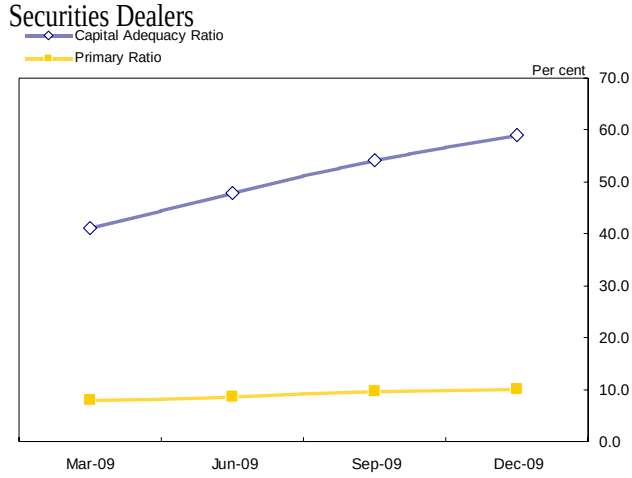


Figure 4.28 Insurance Companies Total Assets and Insurance Penetration in the Domestic Economy

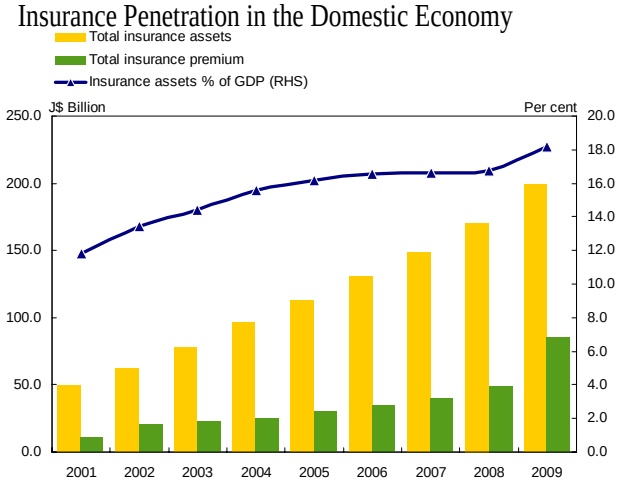
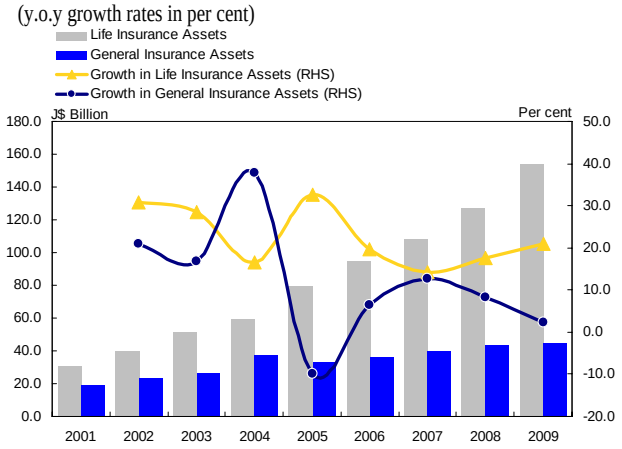


Figure 4.29 Life and General Insurance Assets
(y.o.y growth rates in per cent)



4.3.2 Insurance Companies

The life insurance sector continued to record strong growth in assets in 2009. At end-2009, total assets amounted to $198.6 billion compared to $170.8 billion at end-2008. Premiums on the other hand, increased sharply in 2009 relative to 2008. During the 2009, total insurance premiums increased to 85.1 billion relative to 48.6 billion in 2008. This represented an increase of 75.1 per cent when compared to the previous year. This increase can be attributed to domestic uncertainties that existed during the review period. By comparison with other financial sectors, however, insurance sector penetration in the financial sector is one of the lowest, indicating a still relatively underdeveloped market, especially in the area of general insurance. At end-2009 insurance assets as a percentage of GDP amounted to 18.0 per cent relative to 16.5 per cent in 2008 (see Figure 4.28).

Over the last 9 years, growth in insurance assets, particularly, general insurance companies have fluctuated significantly. In 2009, the stock of assets in the general insurance companies increased marginally to approximately 2.3 per cent, relative to 8.4 per cent at end-2008, while growth in life insurance assets increased to 21.1 per cent at end-2009 relative to 17.7 per cent at end-2008 (see Figure 4.29). Additionally, total life and general insurance assets at the end of the review period was approximately J$153.9 billion and J$44.7 billion, compared to respective amounts of J$123.1 billion and J$43.7 billion at end-2008. Consequently, total insurance assets at end-2009 was J$198.6 billion compared to J$170.8 billion at end-2008.

During 2009, insurance claims rose significantly amidst the adverse economic environment. However, these losses only partially impacted institutions profits. Consequently, the majority of the sector continued to record positive return on assets at end-2009 (see Figure 4.31).

Key insurance sector indicators performed creditably during 2009 (see Table1.1). In terms of the general insurance companies, net premium to capital, a measure of risk arising from underwriting operations, declined to approximately 93.0

per cent at end-2009 relative to 104.1 per cent at end-2008. In contrast, capital to total assets stood at 416.4 per cent relative to 492.7 per cent at end-2008.

The risk retention ratio, a measure of the amount of risk that is passed on to reinsurers declined marginally in 2009 to 50.4 per cent and 98.2 per cent for general and life insurance companies relative to respective amounts of 51.6 per cent and 98.6 per cent in 2008.[21]

At end-2009, the expense ratio for life and general insurance companies was approximately 155.4 per cent and 131.8 per cent, respectively, relative to respective ratios of 121.6 per cent and 106.8 per cent at end-2008.[22] The significant increase in insurance expenditure during 2009 was due to the growth in operating costs as well as increases in insurance liabilities.

Regarding the ratios of investment income to net premium and investment income to investment assets, for the life and general insurance companies, these ratios were 17.8 per cent and 31.2 per cents, respectively, at end-2009 compared to respective ratios of 22.7 per cent and 24.2 per cent at end-2008. Additionally, the sectors' return on investment continued to improve during 2009. In particular, for the life and general insurance companies, the ratio increased to 15.2 per cent and 12.9 per cent, respectively at end-2009 from respective ratios of 11.7 per cent and 10.8 per cent at end-2008.

Figure 4.31 Returns on assets of the insurance sector
(blue = general insurance, yellow = life insurance)

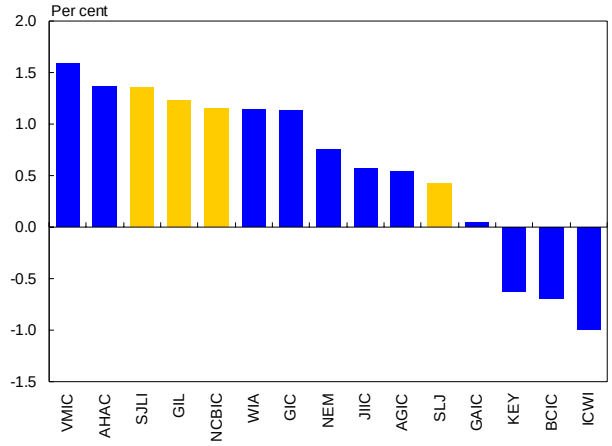
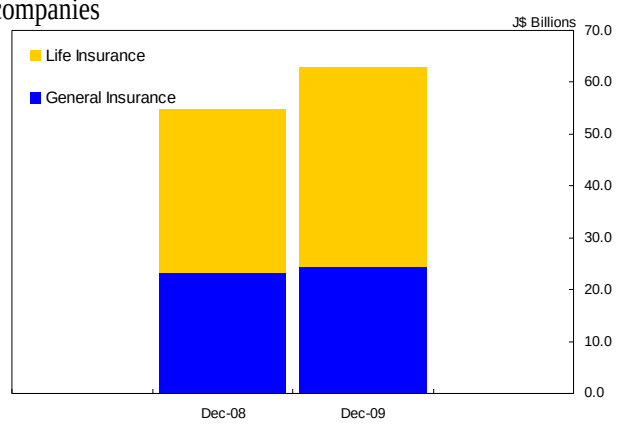


Table 1.1 Insurance Companies Financial Soundness Indicators

General Insurance		**2008**	**2009**
Capital Adequacy	Net premium/capital	104.1	93.0
	Capital/total assets	27.9	29.5
	Capital/technical reserves	-	-
Reinsurance and acturial issues	Net premium/gross premium	51.6	50.4
Earnings & profitability	net claims/net premiums	-	-
	expenses/net premium	106.8	121.6
	investment income/net premium	24.2	31.2
	investment income/investment assets	10.8	12.9
Life Insurance			
Capital Adequacy	Net premium/capital	-	-
	Capital/total assets	24.7	25.0
	Capital/technical reserves	-	-
Reinsurance and acturial issues	Net premium/gross premium	98.5	98.2
Earnings & profitability	net claims/net premiums	-	-
	expenses/net premium	131.8	155.4
	investment income/net premium	22.7	17.8
	investment income/investment assets	11.7	15.2

Figure 4.32 Capital base of life and general insurance companies



[21] The use of net premium in the calculation of the risk retention ratio is a convenient proxy for retained indemnity risk, that is, risk the insurer retains after reinsurance, which are the risks that must be covered by institutions own capital (see IFC Bulletin, No. 23 October 2005.

[22] The insurance expense ratio, measured by total expenses to net premium, captures the extent to which the insurance sector is impacted by significant recurring expenditure.

5. I Overview

In 2009, Jamaica's economic environment was characterized by continued contraction in real economic activity, a rising fiscal deficit and heightened uncertainty in the financial markets. These developments were reflected in the increased vulnerability of the banking system to high exposures in household, corporate and public sector debt during the year. By extension, loan quality for the household and corporate sectors further deteriorated in 2009. Nonetheless, the resilience of the banking system to shocks impacting corporate, household and public sector debt was strengthened by increased levels of banking system capitalization and tighter banking system surveillance during the year. Improvements in loan quality for the banking system will be dependent on growth in domestic economic activity and fiscal containment.

5.2 Household Debt and Banking System Exposure

At end-2009, household debt accounted for 48.9 per cent of total banking sector credit, relative to 50.0 per cent at end-2008. Despite this decline, household debt continued to account for the bulk of banking sector credit. Household debt with the banking system grew marginally by 3.0 per cent, representing a sharp deceleration, relative to growth of 24.9 per cent for 2008 (see **Figure 5.1**).[23] This deceleration reflected a slowdown in the growth of mortgage loans and a decline in consumer loans during 2009 (see **Figure 5.2**). For the review year, consumer loans declined by 3.0 per cent compared with growth of 22.4 per cent in 2008, while mortgage loans grew by 10.4 per cent, relative to growth of 28.1 per cent for the prior year. The weak performance in household credit occurred in a context of continued contraction in real economic activity and residential construction during 2009.[24] Additionally, higher loan rates for personal and mortgage loans by some sectors contributed to the slower rate of expansion in household debt in the banking

Figure 5.1 Growth in Household Debt & Banking System Assets

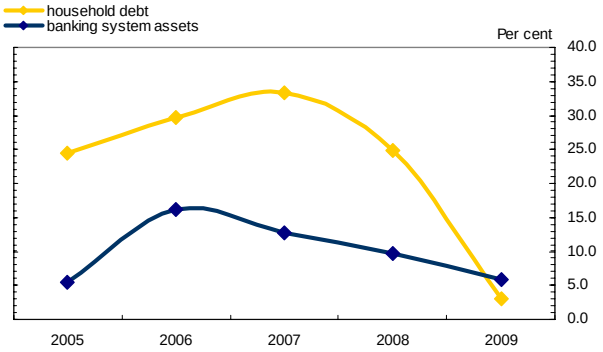


Figure 5.2 Composition of Household Debt

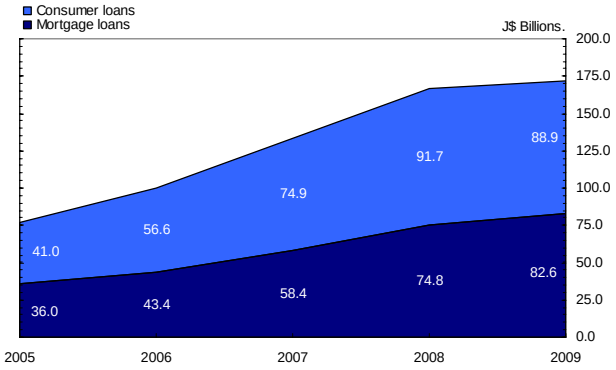
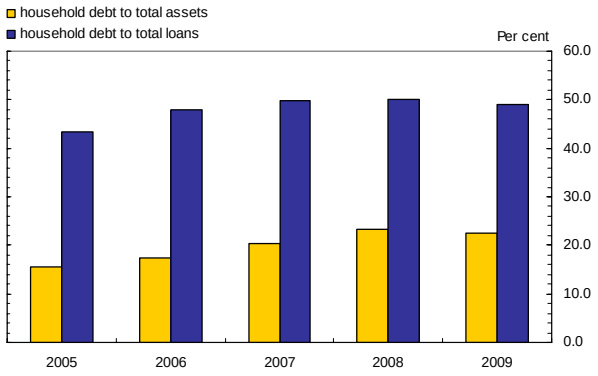


Figure 5.3 Household Debt as a Share of Banking Sector Loans & Assets



[23] Household debt incurred with the banking sector is proxied by the sum of residential mortgage loans and consumer loans (which includes credit card receivables).

[24] During 2009, it is estimated that real GDP contracted by 2.7 per cent relative to a decline of 0.9 the previous year. Additionally, residential construction, as determined by the number of housings starts and completions, recorded a decline of 37.4 per cent in 2009.

Table 5.1 Selected Interest Rates & Housing Data

	2008	2009
Sectoral Interest rates		
Building Societies		
Motgage Loans Rate	12.56	12.59
Bridging Loans Rate	16.53	17.02
Average weighted Loan Rate	12.56	12.57
New Mortgate Loans J$BN	4.32	2.17
Commercial bank		
Installment Credit Rate	20.39	21.47
Motgage Loans Rate	7.57	6.95
Personal Credit Rate	24.93	23.99
Average weighted Loan Rate	16.78	16.19
FIAs		
Installment Credit Rate	18.66	21.56
Personal Credit Rate	14.33	17.84
Average weighted Loan Rate	15.69	17.57
Housing Data		
Residential Construction		
Total Housing Starts	3 703	2 130
Total Housing Completion	5 217	3 454

Figure 5.4 Household Sector Loan Quality

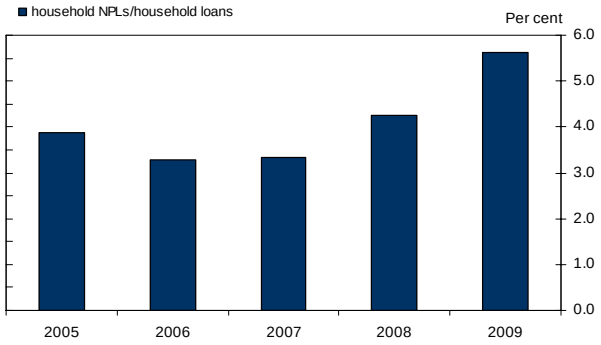
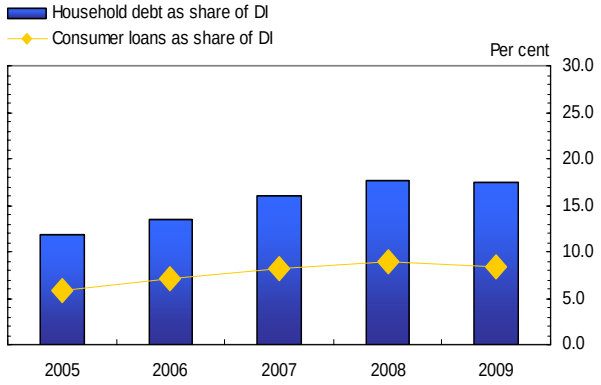


Figure 5.5 Household Debt and Consumer Loans to the banking system as a Share of Income



system during the year (see **Table 5.1**). Notably, at end-2009, personal loan rates charged by FIAs increased to 17.8 per cent from 15.7 per cent at end-2008; however, there was a marginal decline of 0.9 percentage point in the rate charged on personal loans by the commercial banks. Interest rates charged on mortgage loans increased by 0.03 percentage point for the building societies, the largest lenders of mortgage loans for the banking system.

Household debt as a share of banking sector assets also recorded deceleration in growth during 2009, albeit marginal. This ratio was 22.6 per cent at end-2009 relative to 23.3 per cent in 2008 (see **Figure 5.3**). The slight decline in the share of household debt to banking system assets is indicative of reduced consumer demand in light of the continued contraction in the domestic economy.

During 2009, there was continued deterioration in household sector loan quality, measured as the ratio of non-performing loans to total loans. Non-performing loans (NPLs) as a share of total loans deteriorated to 5.6 per cent at end-2009 relative to an average of 3.8 per cent over the past five years (see **Figure 5.4**). The deterioration in household sector loan quality during 2009 was largely influenced by increased levels of unemployment, reduced remittance inflows and a general slowdown in economic activity which impaired householders' capacity to repay their loans. At end-2009, the unemployment rate increased to 11.6 per cent relative to 10.9 per cent in 2008 while remittance inflows declined by 11.3 per cent during the review year.

The banking systems' coverage of household NPLs increased to 66.7 per cent at end-2009 compared with 63.4 per cent at end-2008.[25] This increase can be primarily attributed to a faster pace of growth in loan loss provisioning relative to the rate of growth

[25] Measure as the ratio of loan loss provisions to household non-performing loans.

in NPLs. Notwithstanding, the value of the ratio in 2009 was below the five year annual average of 104.8 per cent.

5.2.1 Household Sector Performance

Relative to the past five years, the debt servicing capacity of the household sector deteriorated in 2009. Household debt as a proportion of disposable income increased to 17.4 per cent at end-2009, well above the five year annual average of 13.9 per cent.[26] However, in comparison to 2008, the debt servicing capacity of the household sector improved marginally by 0.3 per cent during 2009 (see **Figure 5.5**).[27] This improvement was attributed to a faster pace of growth in disposable income relative to household sector debt during the year. Disposable income grew by 2.1 per cent while household sector debt increased by 0.6 per cent. The slower rate of growth in household debt for the year was primarily as a result of a 23.0 per cent decline in loans extended by the National Housing Trust (NHT), amidst decreased demand due to affordability challenges for borrowers.

Also of importance is that consumer loans as a share of disposable income declined marginally to 8.4 per cent at end-2009 relative to 8.8 per cent at the end of the previous year, consistent with the continued contraction in the economy.

5.3 Corporate Sector Debt and Banking System Exposure

In 2009, banking system exposure to the corporate sector remained virtually unchanged at 19.2 per cent (see **Figure 5.6**).[28] However, relative to a five year average of 15.0 per cent,

Figure 5.6 Corporate Sector Debt as a Share of Banking Sector Assets

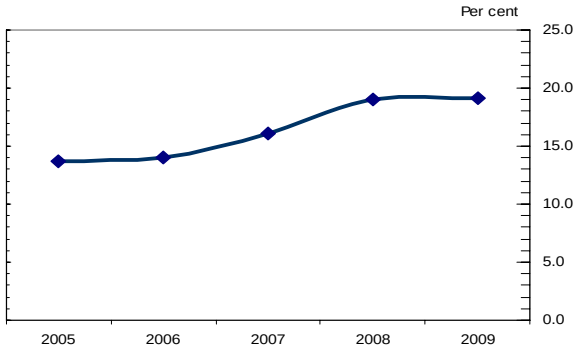


Figure 5.7 Banking Sector Exposure to Corporate Loans

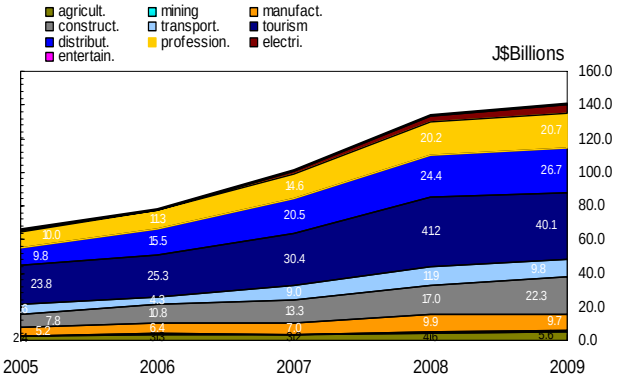
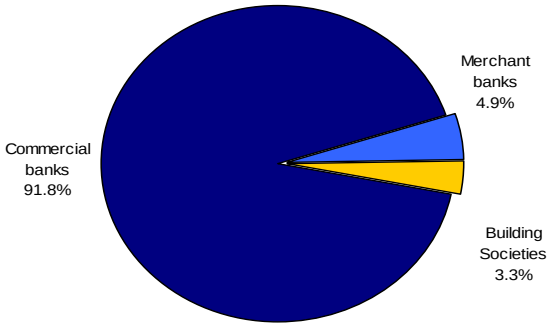


Figure 5.8 Corporate Sector Debt Holding by Sector as at end-2009



[26] Household debt is proxied by the sum of residential mortgage loans, consumer loans (which includes credit card receivables) and NHT loans.

[27] Disposable income for 2009 was estimated based on the annual growth rate in nominal Gross Domestic Product (GDP).

[28] Corporate sector loan is defined as loans for commercial purposes, loans to other financial institutions and notes & debenture holdings of the banking sector. Corporate sector debt as a proportion of total assets increased to 19.2 per cent at end-2009, in comparison to 19.1 per cent at end-2008.

Figure 5.9 Corporate Sector Loan Quality

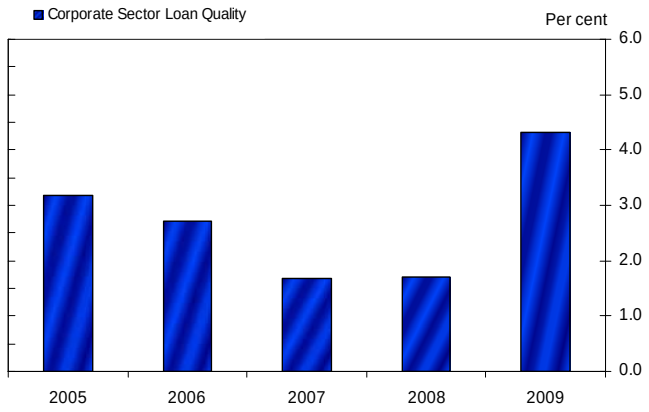


Figure 5.10 Ratio of Corporate Sector NPLs to Corporate Sector Loans-Banking Sector

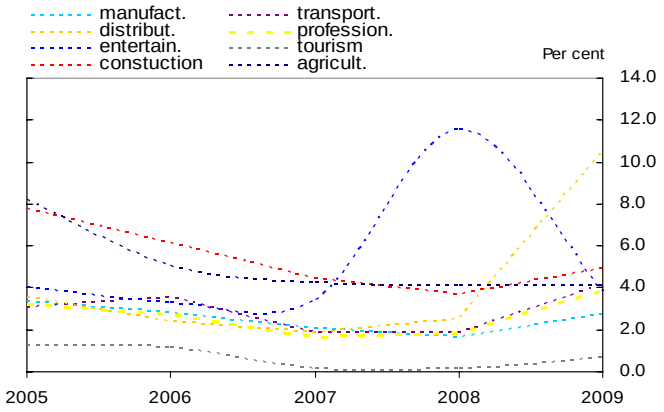
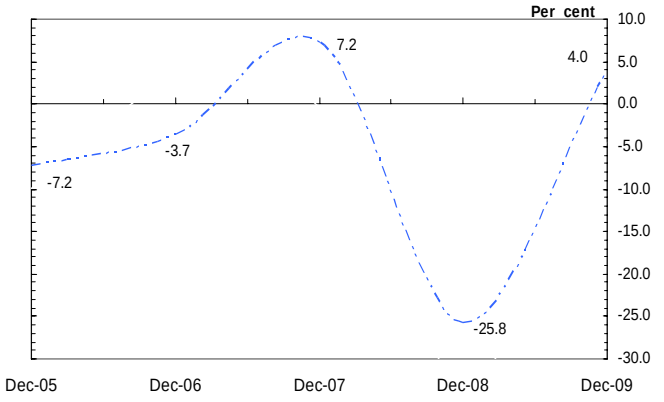


Figure 5.11 Annual Growth of the JSE Index



indicating an increasing shift in banks loan portfolio towards corporate sector debt. For the year, exposure to corporate sector debt largely reflected growth in lending to *Agriculture*, *Construction*, *Entertainment* and *Electricity* which together accounted for 23.3 per cent of total credit extended. The impact of this growth was offset by a reduction in borrowings of 2.6 per cent from the tourism sector, which nonetheless accounted for the largest share of credit extended to the corporate sector (see **Figure 5.7**). Additionally, during 2009, *Mining* and *Transport, Communication & Storage* recorded the steepest declines in credit of 35.4 per cent and 17.7 per cent, respectively. The decline in lending to these sectors was consistent with the continued economic contraction in these sectors. *Mining* and *Transport*, *Communication & Storage* declined by 50.0 per cent and 4.8 per cent, respectively, in 2009 relative to an average annual growth rate of 0.9 per cent and 1.6 per cent over the past five years, signalling the possibility for increased default risk on these loans (see **Chapter 2**).

At end-2009, the commercial banks were the most vulnerable to corporate sector debt, (see **Figure 5.8**). For the review period, commercial banks accounted for approximately 92.0 per cent of total lending to the corporate sector, while the merchant banks' and building societies' share of total corporate sector lending was 4.9 per cent and 3.3 per cent, respectively.

5.3.1 Corporate Sector Loan Quality

Against the background of further contraction in real GDP, corporate sector loan quality deteriorated in 2009. The ratio of corporate sector NPLs to total corporate sector loans increased sharply to 4.3 per cent during 2009, relative to 1.7 per cent at end-2008 and an average value of 2.5 per cent over the past five years (see **Figure 5.9**). In examining the delinquency rate by sector, *Distribution*, *Construction* and *Mining* recorded the highest NPL ratios, ranging between 4.9 per cent and 10.5 per cent in 2009. In contrast, the banking sector was least exposed to deterioration in loan quality related to *Tourism, Manufacturing* and *Electricity & Water* which averaged 1.1 per cent for all three sectors (see **Figure 5.10**).

5.3.2 Performance of Companies Listed on the Jamaica Stock Exchange (JSE) during 2009

The local stock market rebounded in 2009, following the negative impact of the global financial turmoil in 2008. For 2009, the Main JSE Index grew by 4.0 per cent in contrast to a decline of 25.8 per cent the prior year (see **Figure 5.11**). The increase in the Index was primarily influenced by relative stability in the foreign exchange market and downward adjustments in domestic interest rates, primarily in the last three quarters of the year. The stock market advance-to-decline ratio at end-2009 also signalled an improvement in market performance and was 17:19 compared with 8:28 at end-2008. Advancing stocks were mainly concentrated in *Conglomerate, Tourism* and *Finance* accounting for nine of the top ten advancing stocks. The top ten declining stocks were mainly from *Manufacturing* and *Communication*.

Despite the improvement in the Index, there was a marked reduction in trading activities as reflected in the overall volumes and values traded during the year. For 2009, the volumes and values traded fell by 27.6 per cent and 52.5 per cent, respectively, indicative of continued risk aversion by equities investors (see **Table 5.2**).

Corporate sector profitability of listed companies as measured by return on assets (ROA), varied across categories of stocks listed on the JSE during 2009.[29] Relative to end-2008, profit performance for listed entities within *Retail* and *Insurance* recorded declines while companies listed within *Conglomerate, Tourism, Financial* and *Manufacturing* showed improved asset utilization during the review period. (see **Figure 5.12**).

Table 5.2 Annual Growth in Volumes, Values & Number of Transaction on the JSE: 2008-2009

	Values Traded (J$MN)	Volumes Traded (Units- MN)	Number of Transcation
Mar-08	8,730.9	675.7	9,022.0
Jun-08	6,277.3	531.3	7,439.0
Sep-08	5,042.7	569.1	7,012.0
Dec-08	4,191.3	519.6	7,380.0
Total	24,242.1	2,295.8	30,853.0
Mar-09	2,085.9	629.1	4,341.0
Jun-09	1,358.1	191.0	3,407.0
Sep-09	2,541.9	339.0	4,019.0
Dec-09	5,528.5	503.0	4,262.0
Total	11,514.4	1,662.2	16,029.0
	Annual Change %		
Values Traded		(52.5)	
Volumes Traded		(27.6)	
# of Transaction		(48.0)	

Figure 5.12 ROA for Listed Companies by Sector

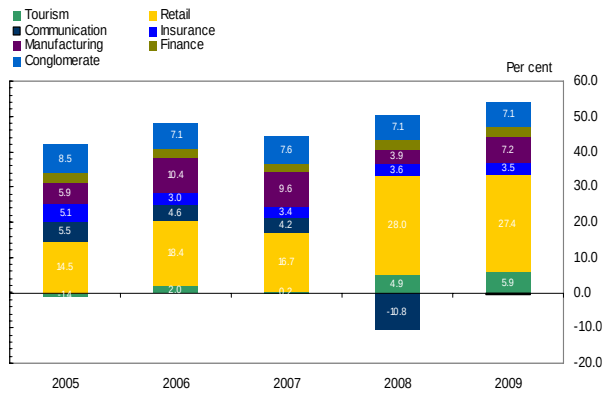
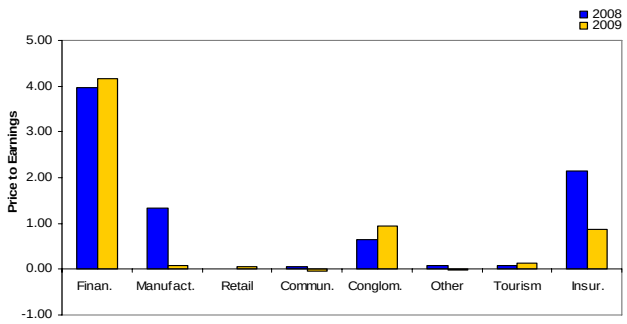


Figure 5.13 Weighted Price-to –Earnings Ratio for Listed Companies by Sector



[29] Return on assets measures profits as a proportion of average total assets. The ratio is indicative of how efficiently institutions are utilizing their assets to generate profits.

Figure 5.14 Public Sector Loans and Securities to Assets & Capital - Banking Sector

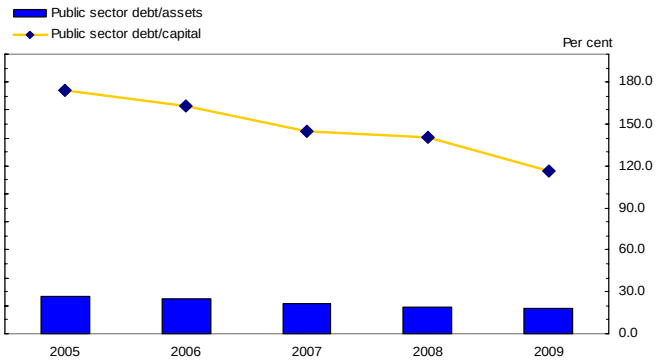


Figure 5.15 Growth in Public Sector Debt Stock

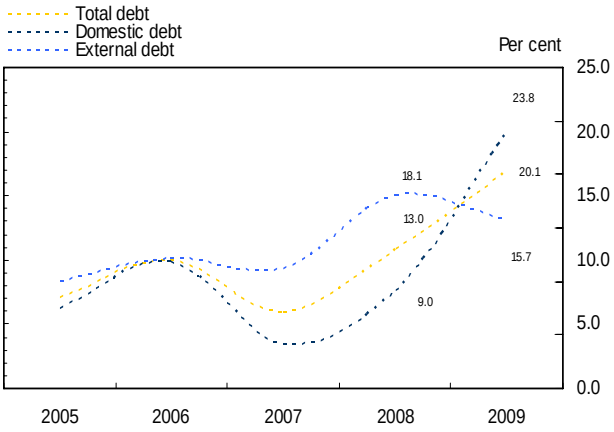
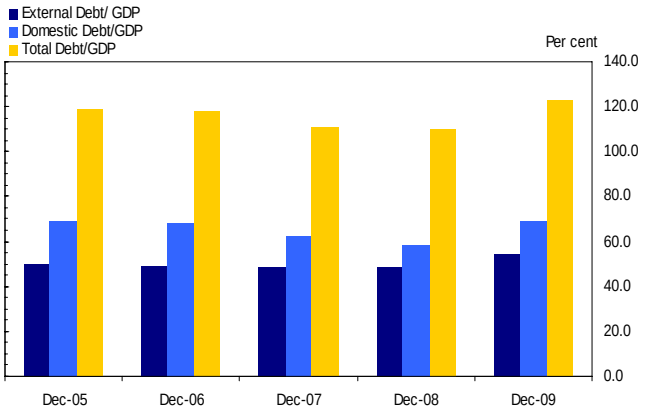


Figure 5.16 Debt to GDP Ratios



The ROA for entities in *Insurance* and R*etail* was 3.5 per cent and 27.4 per cent at end-2009, relative to 3.6 per cent and 28.0 per cent, respectively at end-2008. This marginal decline in the ratios is attributed to lower profits during 2009 amidst the general slowdown in the local economy. Notwithstanding this decline, the profitability ratio for the *Retail* stocks on average was the highest among all the sectors listed on the JSE.

Despite, the weakness in local economic activity, ROA for *Manufacturing* and *Tourism* improved to 7.2 per cent and 5.9 per cent, respectively. This compared favourably to returns of 3.9 per cent and 4.9 per cent recorded in the previous year. Notably, *Communication* recorded the highest improvement in ROA albeit to a decline of 0.6 per cent in 2009 compared with a decline of 10.8 per cent in 2008. The improvement in these sectors reflected enhanced operational efficiencies.

In examining investors' perception of future earning growth of listed companies, the weighted price-to-earning (P/E) ratio was calculated.[30] Equity investors expect the future earnings of stocks in *Financial*, *Conglomerate* and *Retail* to increase, though marginal, as reflected in an increase in the ratio at end-2009 relative to end-2008. The P/E ratio for these sectors averaged 1.7 times at end-2009 relative to an average ratio of 1.5 times in 2008 (see **Figure 5.13**).

5.4. Banking Sector Holdings of Public Sector Debt

The banking sector's exposure to public sector debt declined during 2009.[31] At end-2009, the ratio of public sector loans and securities to banking system assets declined to 18.1 per cent relative to 19.1 per cent at end-2008 and a five year annual average ratio of 23.1 per cent (see **Figure 5.14).** The decline in the ratio during 2009 was largely influenced by a 2.4 per cent reduction in the holdings of public sector securities during the year, and was largely reflected in the commercial banks. Additionally, the ratio of public sector loans and securities to banking sector capital signalled decreased exposure to public

[30] The P/E ratio is calculated as the market value per share divided by the per share earnings of a company. The ratio was then weighted by the market capitalization of each listed company.

debt. The ratio fell steeply to 116.7 per cent at end-2009, relative to a five year average of 160.0 per cent.

5.4.1 Public Sector Indebtedness & Performance

Public sector debt as a share of GDP increased to 123.0 per cent at end-2009 from 106.9 per cent at end-2008, reflecting the faster rate of growth in public sector debt stock relative to GDP (see **Figure 5.16**). During 2009, the public sector debt stock grew by 20.1 per cent compared with a 13.0 per cent growth the previous year. The increase in the debt stock reflected growth of 23.8 per cent and 15.7 per cent in domestic currency debt and external debt, respectively (see **Figure 5.15**). Notably, at end-2009, domestic debt continued to account for the bulk of public sector debt. Domestic debt as a share of total public sector debt was 56.1 per cent at end-2009.

The increase in domestic debt during the review period reflected the funding of a larger than budgeted fiscal deficit in a context of weaker than projected revenue flows and higher than budgeted interest costs. Additionally, domestic currency debt increased amidst limited debt raising opportunities on the international market coupled with a delay in the timing of loans from the multilateral institutions. Furthermore, during the year, the fiscal stability ratio (FSR), which captures the stability of government finances, continued to deteriorate. The ratio declined to 1.4 at end-2009 relative to a value of 1.2 at end-2008 (see **Figure 5.17**).[32]

Figure 5.17 Fiscal Stability Ratio

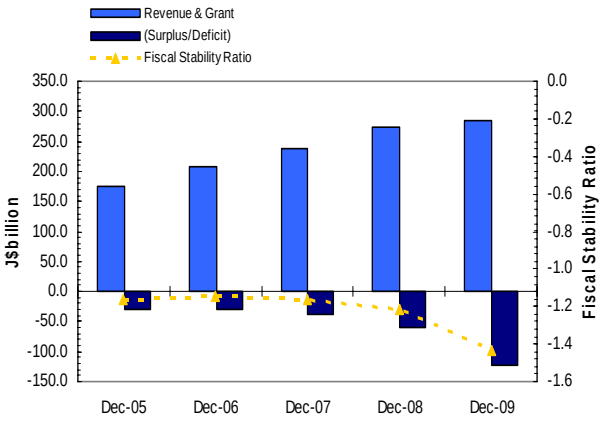


Figure 5.18 Domestic Debt Interest Rate Composition

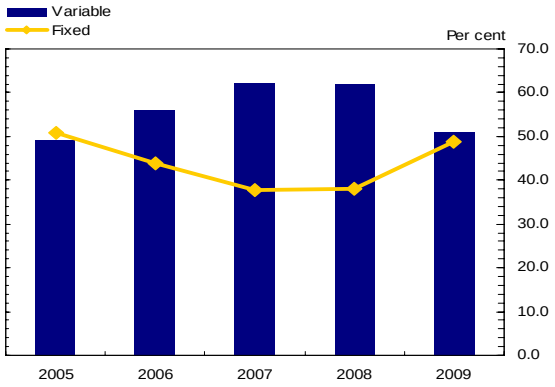
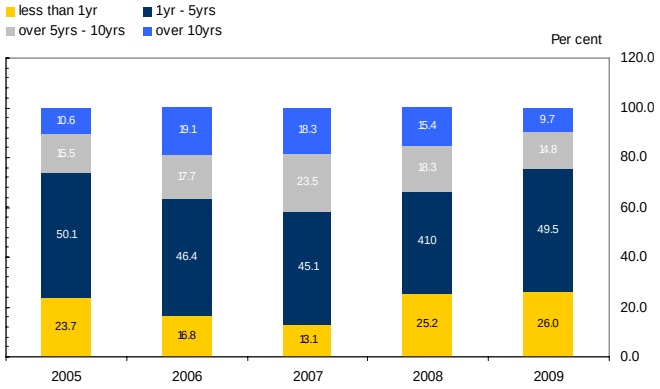


Figure 5.19 Domestic Debt - Maturity Profile



[31] Exposure is measured by public sector loans and securities as a share of banking system assets. Public sector comprises Public Entities and Central Government.

[32] The FSR is computed as the ratio of overall fiscal balance to total revenue less 1 (one). The closer the FSR is to zero indicates more stable government finances.

Figure 5.20 External Debt - Maturity Profile

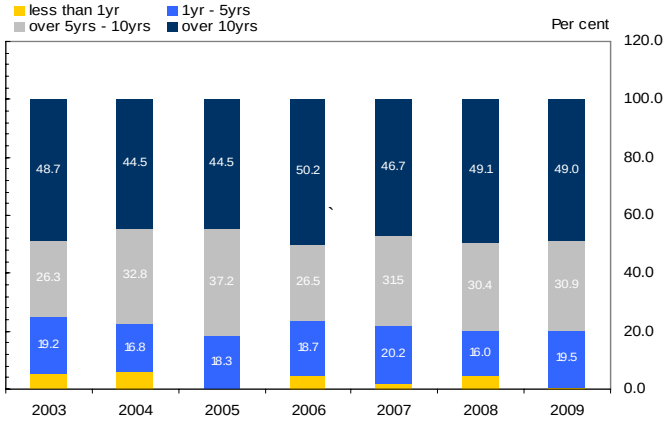
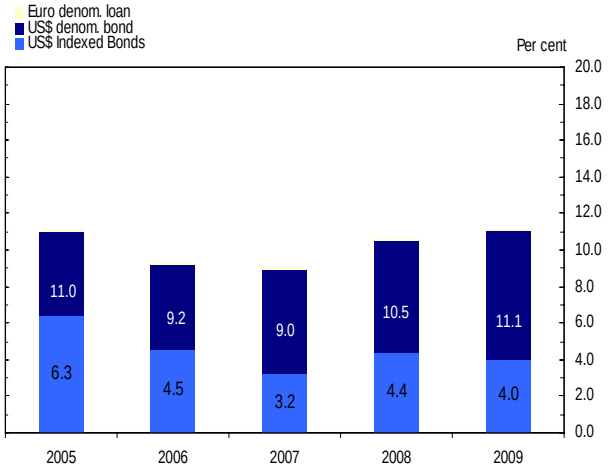


Figure 5.21 Foreign Linked Debt in Domestic Debt Portfolio



Amidst these fiscal challenges, the banks of Jamaica reduced interest rates on several occasions during the year. This reduction resulted in an increased in the share of fixed rate instruments in the domestic debt portfolio (see **Figure 5.18**).[33] The share of fixed rate instruments as a proportion of the debt portfolio grew by 10.9 percentage points to 48.9 per cent at end-2009, while the share of variable rate instruments declined to 51.1 per cent, from 61.9 per cent in 2008. This as investors sought to hedge themselves from price volatility by investing more and more in fixed rate securities with shorter maturities.

Short-term domestic debt as a proportion of total debt grew by 2.8 per cent to 26.0 per cent in 2009. [34] Correspondingly, investments in the '1 to 5 years' maturity bucket increased by 20.6 per cent to 49.5 per cent in 2009 relative to 2008 (see **Figure 5.19**). This is indicative of increased refinancing risks for the Government. Hence, the Government had to contemplate significant changes in the maturity profile of the debt stock in order to make it more sustainable in the medium-term. Consequently, the JDX was launched in early 2010 and resulted in the swap of J$700.0 billion of domestic bonds for new bonds with lower yields and extended maturity.

The composition of the external debt maturity profile continued to reflect longer-term fixed rate instruments. Investments in the over '5 to 10 year' maturity bucket remained relatively flat during the year and accounted for 49.0 per cent of the total external debt portfolio (see **Figure 5.20**).

[33] On 02 November 2009, S&P lowered its long-term foreign and domestic sovereign credit rating on Jamaica to 'CCC' from 'CCC+' and maintained a negative outlook. On 18 and 24 November 2009, respectively, ratings Agencies Moody's and Fitch also downgraded Jamaica's local and foreign currency government bond ratings. Moody's downgraded Jamaica's local and foreign currency government bond ratings by two notches to Caa1 from B2. Fitch downgraded Jamaica's local and foreign currency government bond ratings by three notches to 'CCC' from 'B'. The outlook also remained negative for both agencies.

[34] Short term domestic debt represents investments in the 'less than 1 year' maturity bucket

There was an increase in the vulnerability of the government's debt portfolio to foreign exchange rate shocks, in 2009 relative to 2008. This increase was partly attributable to the instability in the foreign exchange market that occurred during the first quarter of 2009. At end-2009, foreign currency linked debt in the domestic debt portfolio accounted for 15.2 per cent of total domestic debt relative to 15.0 per cent at end-2008. Correspondingly, US dollar denominated bonds totalled J$83.7 billion or 11.1 per cent of total domestic debt at end-2009 relative to J$64.2 billion or 10.5 per cent at end-2008 (see **Figure 5.21**).

6. Risk Assessment of the Banking Sector

Overview

The banking system was robust to both actual and hypothetical shocks during 2009. The year was characterised by an overall increase in banking sector liquidity, relative stability in the bond market but increased credit risk due mainly to an expansion in non-performing loans. Despite the challenges encountered during the year, deposit taking institutions (DTIs) sought to reduce exposures and increase their capital bases. This coupled with the reduction in interest rates ensured that financial stability of the banking system was maintained throughout the year.

6.1 Market Risks

6.1.1 Liquidity Funding Risk Assessment of the Banking System

Trends in Liquidity Indicators

The results from the banking system's liquidity indicators were mixed for 2009. There were increases in funding to the banking system, overall net funding positions, the liquidity ratio and liquid assets to total assets ratio that signalled increased liquidity. However, there were decreases in the short-term cumulative gaps and a decrease in the ratio of short-term assets to short-term liabilities.

There was a slowdown in the annual growth rate of the banking system's funding base to 5.1 per cent at end-2009 relative to 9.5 per cent at end-2008. In particular, for 2009 there was accelerated growth in deposits of 8.7 per cent relative to 4.5 per cent the previous year but the impact of this was partly offset by respective reductions in borrowings and interbank funding of 8.9 per cent and a 3.5 per cent. At end-2008, borrowings had declined by 15.7 per cent and interbank funding had increased by 43.7 per cent.

At end-2009, deposits increased to 75.8 per cent of banking system funding from 73.4 per cent at end-2008. Interbank funding accounted for 19.5 per cent of total system funding at end-2009 down from 21.3 per cent at end-2008. Borrowings declined to 4.6 per cent of total banking

Figure 6.1 Funding Structure of the Banking Activities (January 2004-December 2009)

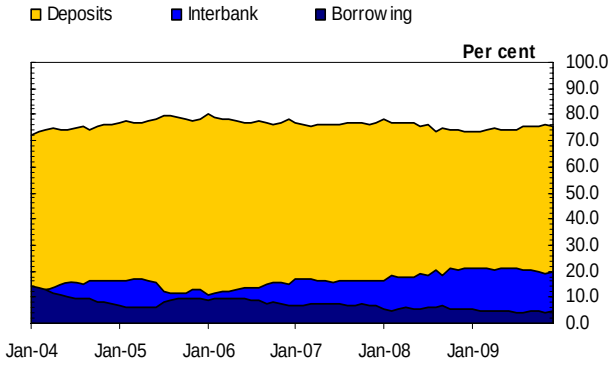


Figure 6.2 Weekly Range for Inter-Bank Rates (January 2008 - December 2009)

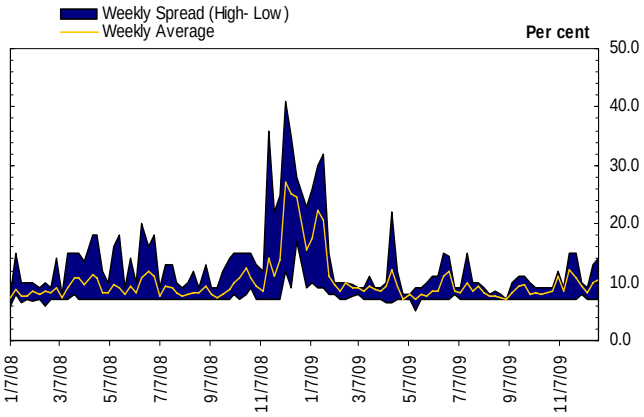


Figure 6.3 Loans to Deposit Ratio

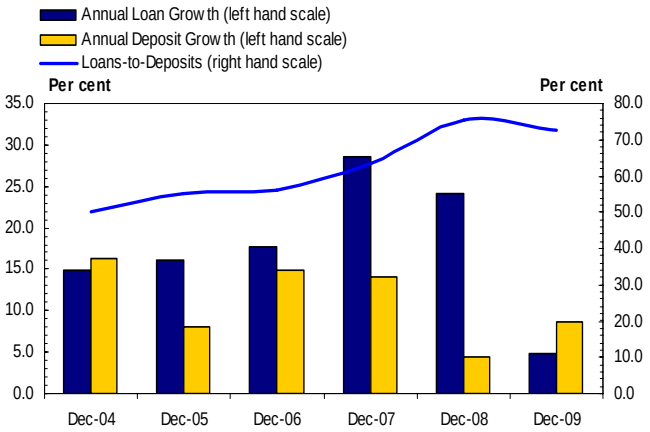


Figure 6.4 Overall Net Funding Positions (January 2004-December 2009)

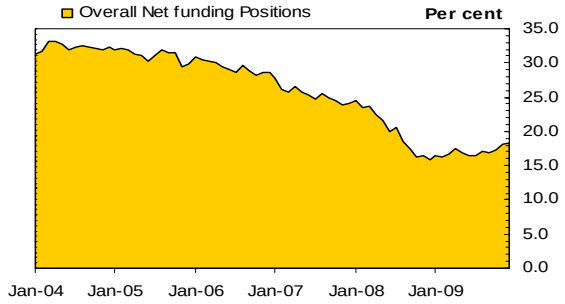


Figure 6.5 Core Liquidity-Liquid Assets to Total Assets

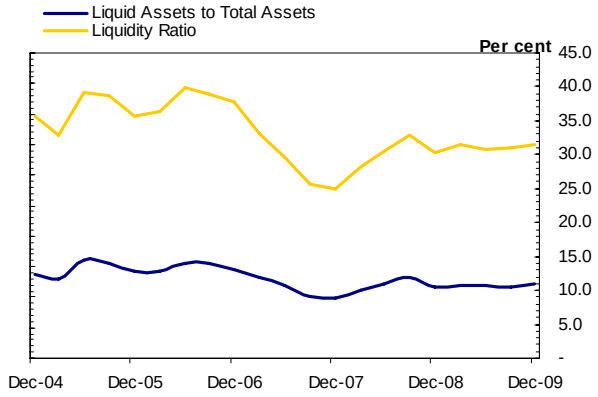
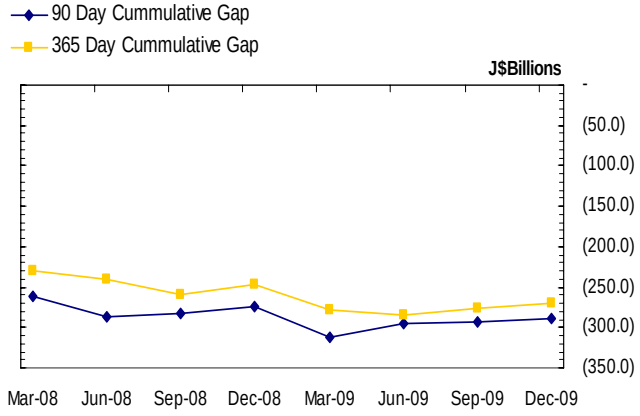


Figure 6.6 90-days and 365-days Cumulative Gap of the Banking System



system funding at end-2009 relative to 5.4 per cent at end-2008 (see **Figure 6.1**).

As a consequence of the reduced reliance on interbank funding in 2009, interbank yields averaged 11.9 per cent down from an average of 14.8 per cent for 2008. Also, spreads narrowed significantly in 2009 relative to 2008 (see **Figure 6.2**).

The negative GDP growth in the Jamaican economy in 2009 affected the banking system's loan expansion. Specifically, the annual growth in loans issued by DTIs decelerated significantly to 4.8 per cent at end-2009 relative to annual loan growth of 24.2 per cent at end-2008. Given the increase in deposits of 8.7 per cent for 2009, the ratio of total loans to total deposits declined to 72.7 per cent compared to 75.4 per cent at end-2008 (see **Figure 6.3**). Also, in the context of the sharp deceleration in growth of loans relative to the growth in deposits, the overall net funding position of the banking system increased to 18.3 per cent at end-2009 from 15.8 per cent at end-2008 (see **Figure 6.4**).[35] Moreover, there was buoyant Jamaica Dollar liquidity as reflected in both the liquid assets to total assets and the liquidity ratios (see **Figure 6.5**).[36] The liquid assets to total assets and the liquidity ratios increased marginally to 12.1 per cent and 31.4 per cent at end-2009 relative to 11.7 per cent and 30.4 per cent, respectively, at end-2008.

DTI's cumulative gap between assets and liabilities maturing within 90-days and 365-days marginally declined to an average of negative $297.7 billion and negative $277.7 in 2009 from an average of negative $276.2 billion and negative $243.6 billion, respectively 2008 (see **Figure 6.6**). Additionally, the ratio of short-term assets to short-term liabilities for the banking system declined by 2.7 percentage points to 53.6 per cent at end-2009 relative to end-2008 (see Figure **6.7**). Both these indicators revealed heightened short-term liquidity risk.

[35] The net funding position is defined as the ratio of the difference between deposits and gross loans as a percentage of total assets.

[36] The liquidity ratio is defined as the ratio of average prescribed liquid assets to average liquid liabilities.

Trends in the Banking System's Capital Base

The banking system's capital base increased by 21.8 per cent to $76.3 billion at end-2009, relative to end-2008. The players in the banking system made a concerted effort to increase the banks' capital base in 2009 after losses incurred in the December 2008 quarter (see **Figure 6.8**). Commercial banks accounted for 73.2 per cent of the banking system's capital base while building societies and FIAs accounted for 21.9 per cent and 4.9 per cent, respectively.

Liquidity Funding Risk Stress Test Results

At end-2009, liquidity funding stress tests indicated that most institutions were adequately capitalised to absorb hypothetical losses associated with a decline in average deposits of institutions' balance sheet. Specifically, after a hypothetical 50.0 per cent decline in average deposits, building societies were most vulnerable having institutions with post-shock capital adequacy ratio (CAR) below the regulatory benchmark of 10.0 per cent. In contrast, the median post-shock CAR of building societies was 23.7 per cent, well above the regulatory benchmark.

Over the period March 2008 to December 2009, the median post-shock CARs of commercial banks and FIAs declined in the crisis period, September 2008 to March 2009, but rebounded in the June 2009 quarter (see **Figure 6.9**). This mainly reflected the increased capital provisioning.[37] Of note, however, was the significant increase in the range of post-shock CARs of FIAs and building societies over the period. This indicated that some institutions (with larger post-shock CARs) were able to respond faster to the crisis and were better able to increase their capital bases.

Chart 6.7 The Ratio of Assets Maturing Within 1 Year to Liabilities Maturing Within one Year for the Banking System

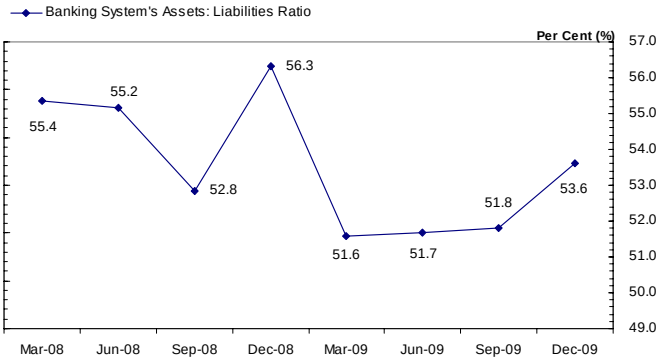


Chart 6.8 Capital Base of the Banking System

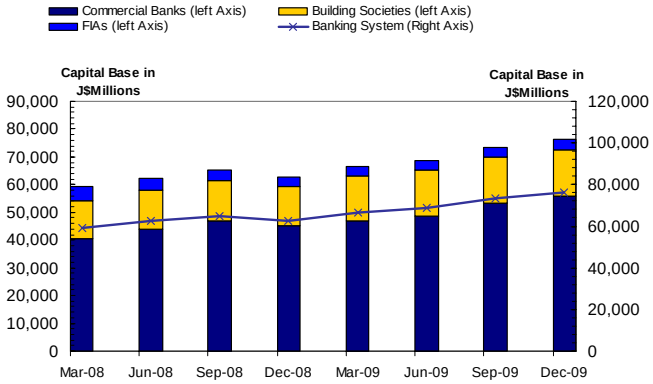
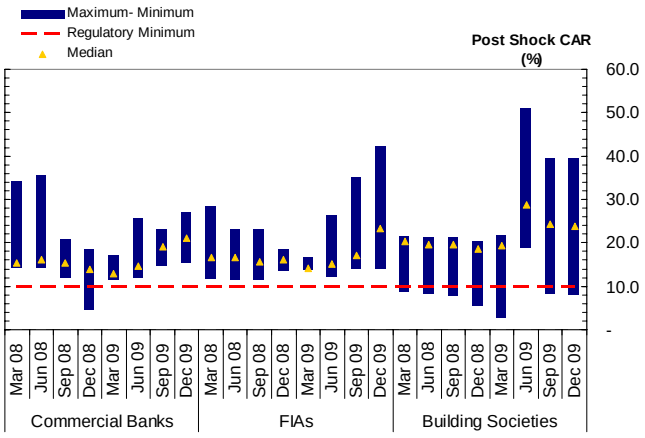


Chart 6.9 Liquidity Funding Risk Stress Test Results for the Banking System



[37] The framework assumed a 'hair cut' (% loss in value) on liquidating each category of assets are: items in course of collection 10%, non-liquid investments 20%, accounts receivables 20%, loans & advances 28% Fixed Assets 36%, Other Assets 90% and resultant losses are written off against the capital buffers first and then statutory capital.

Chart 6.10 Spot Rates and 95.0 Per cent Confidence Bands for Selected Domestic Bond Yields Over 2009

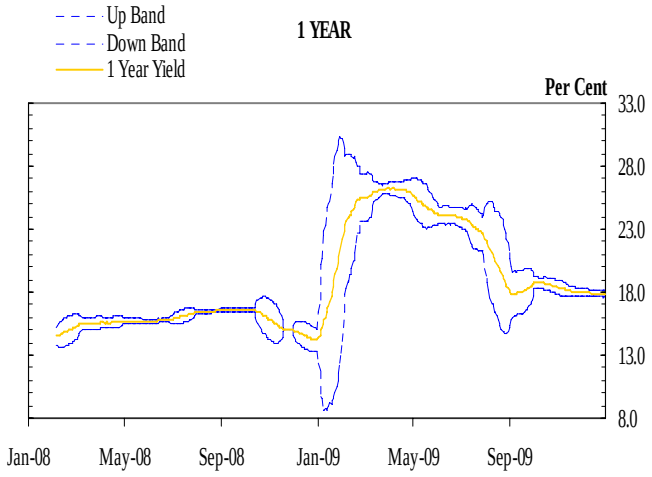
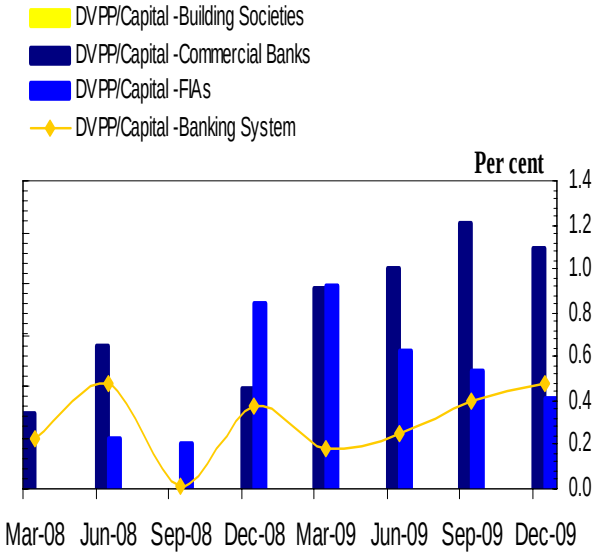


Chart 6.11 Dollar Value of a Percentage Point (DVPP) to Capital for the Banking System



6.1.2 Domestic Interest Rate Risk Exposure

Trends in Domestic Bond Yields

Domestic bond yields in 2009 averaged 23.2 per cent which was 5.7 percentage points higher than average bond yields in 2008. This increase was mainly due to significant shifts in yields at the start of the year mainly driven by instability in the domestic interbank and foreign exchange markets. In 2009, domestic bond yield volatility was greatest at the start of the year but there was also increased volatility in March 2009 and again in September 2009 following debt rating downgrades of Jamaica's domestic and foreign debt by key ratings agencies.[38] However, as the year progressed bond yields declined and at end-2009 the yield on one-year domestic bond was 18.2 per cent. Volatility in yields declined following news of the expected signing of the Stand By Agreement with the International Monetary Fund (see **Figure 6.10**).

Domestic Dollar Value of a Percentage Point to Capital Base (DDVPC) Assessment[39]

The DDVPC for the banking system increased to 0.5 per cent at end-2009 relative to a 0.4 per cent at end-2008 (see **Figure 6.11**). Commercial banks' DDVPC increased to 1.1 per cent at end-2009 relative to 0.5 per cent at end-2008. However, FIAs revealed decreased exposure with their DDVPC declining to 0.4 per cent at end-2009 from 0.9 per cent at end-2008. Building societies were not significantly affected by increases in bond yields in 2008 or 2009 owing to their small investment portfolio size.

Investment Structure of the Banking Sector in Domestic Bonds

There was a 2.8 per cent decline in the banking system's domestic bond investment at end-2009 relative to end-2008. This decline primarily reflected a 6.2 per cent decrease in domestic bond investments maturing within 2 years. The impact

[38] On 4 March 2009 Moody's Investors downgraded Jamaica Government debt. Standard and Poor's debt rating agency (S&P) downgraded Jamaica sovereign debt on 16 March 2009. Standards &Poor's downgraded Jamaica sovereign debt on 5 August 2010. Moody's downgraded local and foreign dent on 18 November 2009.

[39] The DVPC captures the dollar value loss of a percentage point increase in domestic bond yields as a proportion of the capital base.

of this decline was partially offset by growth of 22.5 per cent and 10.8 per cent in investments in securities that would mature within the 2-10 year and over 10 years buckets, respectively. At end-2009, the banking systems' domestic bond investment profile was skewed towards shorter durations with 84.4 per cent due to mature within 2 years and 15.3 per cent to mature in over 2 years. Commercial banks had the largest domestic bond investment to capital base ratio of 159.6 per cent when compared to building societies and FIAs with ratios of 100.3 per cent and 32.6 per cent, respectively. The FIAs recorded a decline in the ratio of domestic bond investments repricing over two years to the total investment portfolio, moving to 47.1 per cent at end-2009 relative to 48.9 per cent at end-2008. Despite the reduction in the longer duration bond holdings, FIAs remained vulnerable to bond yield changes due to the relatively high proportion of longer duration bonds held in their bond investment portfolios. In contrast, at end-2009 commercial banks had 15.4 per cent of securities in its domestic bond investment portfolio repricing in more than two years (see **Figure 6.12**).[40]

Domestic Bond Value at Risk (VaR) Estimate

The historical dollar VaR estimate on domestic bonds for the banking system declined to $2.4 billion at end-2009 from $2.9 billion at end-2008 (see **Figure 6.13**). The VaR on domestic bonds of commercial banks decreased to $1.9 billion from $2.8 billion. However, the historical dollar VaR estimate on domestic bonds for FIAs and building societies increased to $355.6 million and $190.9 million at end-2009 from $41.8 million and $117.0 million at, respectively end-2008. The banking system VaR outturns were consistent with the decreased volatility in GOJ domestic bond yields in the latter part of 2009 (see **Figure 6.10**). As a fraction of the capital base, VaR on domestic bond investment for commercial banks declined but increased for FIAs and building societies at end-2009 relative to end-2008. Specifically, the VaR to capital at end-2009 was 3.3 per cent, 9.4 per cent and 1.1 per cent compared to the end-2008 outturn of 6.1 per cent, 1.3 per cent and 0.8 for commercial banks, FIAs and Building societies, respectively.

[40] Building societies' domestic bond investment portfolio repricing in more than two years was negligible.

Chart 6.12 Repricing Composition of the Domestic Bond Investment of the Banking System at End-December

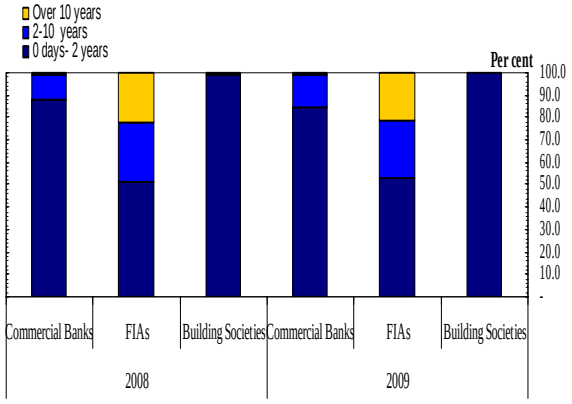


Chart 6.13 Dollar Value at Risk of the Banking System

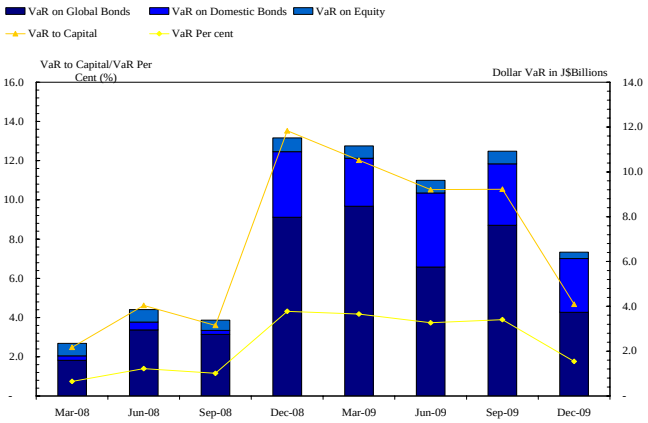


Chart 6.14 Annualized Volatility in Jamaica Dollar to US Dollar Exchange Rate

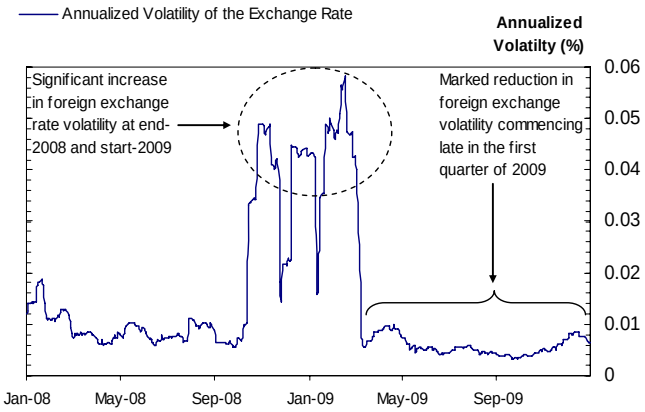


Chart 6.15 Quarterly Ratio of Foreign Exchange Exposure to Tiered Capital 2008)

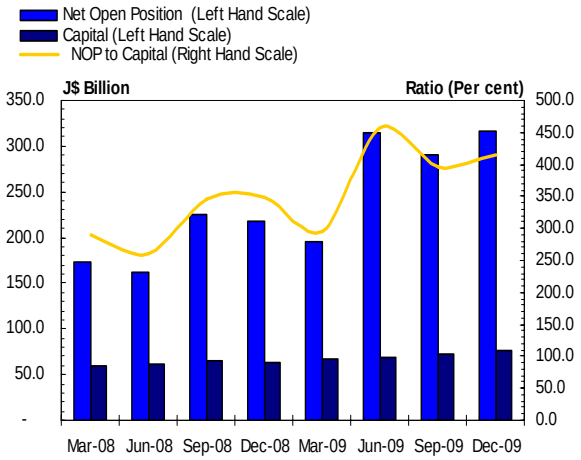
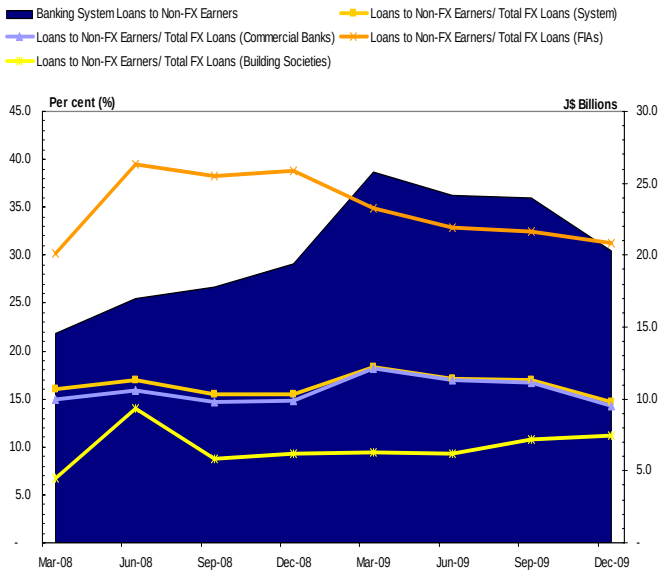


Chart 6.16 Analysis Foreign Currency Loans to Non-Foreign Currency Earners for the Banking System (March 2008-December 2009)



6.1.3 Foreign Exchange Rate Risk and Foreign Currency Bond Exposure

Trends in the Foreign Exchange Rate

The local foreign exchange market displayed significant volatility during the first three months of 2009, particularly in the first half of the quarter (see **Figure 6.14**). These pressures were influenced by a sharp contraction in foreign exchange inflows as well as high Jamaica Dollar liquidity conditions which facilitated an increase in demand for US dollars. The stability in the second half of the quarter was mainly due to the Bank's actions which included moral suasion, the sale of foreign currency to the market and the implementation of a foreign exchange surrender facility for public sector entities. These actions constrained the overall pace of depreciation to 9.4 per cent for the March 2009 quarter, relative to 9.7 per cent in the December 2008 quarter. At end-2009 the exchange rate was US$1: J$89.60, reflecting depreciation in the Jamaica Dollar of 11.0 per cent for the year.

Trends in the Net Open Position (NOP) of the Banking System

As a result of the exchange rate depreciation in the latter part of 2008 and the early part of 2009, the banking system increased its long foreign currency position across all foreign currencies to guard against further Jamaica Dollar depreciation and to ensure adequate supplies to meet the rising demand. Specifically, the NOP of the banking system grew to J$316.6 billion at end-2009 from J$217.8 billion at end-2008. Furthermore, the NOP was 4.2 times the capital base of the banking system at end-2009 compared to a ratio 3.5 times at end-2008 (see **Figure 6.15**). However, DTIs exposure to non-foreign currency earners declined for 2009. Specifically, foreign currency loans issued to non-foreign currency earners as a ratio of total foreign currency loans declined to 14.7 per cent at end-2009 from 15.5 per cent at end-2008 (see **Figure 6.16**).

Foreign Exchange Risk Stress Test Results

At end-2009, all institutions were adequately capitalised to absorb hypothetical losses associated with depreciation in the Jamaica Dollar. Specifically, after a hypothetical 30.0 per cent

depreciation in the Jamaica Dollar, institutions with the minimum post-shock CAR recorded ratios of 15.3 per cent, 12.1 per cent and 17.2 per cent for commercial banks, FIAs and building societies, respectively. Over time, the median post-shock CARs of commercial banks and FIAs declined during the crisis period but normalised in the December and September 2009 quarters, respectively (see **Figure 6.17**). Building societies where minimally affected by the shocks applied and generally exhibited relatively unchanged median post-shock CARs.

The range of the post-shock CARs increased during 2009 for commercial banks and FIAs. The trend in the range for commercial banks moved from a level of increased susceptibility at end-2008 (minimum post-shock CAR was below the regulatory minimum of 10.0 per cent) to a level of relative resilience at end-2009 (see **Figure 6.17**). Despite the minimum post-shock CAR at end-2009 being lower than that which obtained at end-2008, the range in the FIAs' post-shock CARs increased significantly for the review period, relative to end-2008. In addition, the average range in post-shock CARs of building societies was higher during 2009 relative to 2008. This indicated that some institutions were able to respond faster to the crisis and were in a better position to increase their capital bases.[41]

Trends in GOJ Global Bond Yields

Similar to domestic bond yields, there was a significant increase in the volatility of GOJ global bond yields at the beginning of 2009. Although yields trended downwards in 2009, yields were 440.0 basis points higher on average than those recorded in 2008. Despite the significant widening of spreads of GOJ global bonds during the first quarter of 2009, the average volatility in yields of 1.1 per cent for the year was below the average volatility of 2.5 per cent for 2008 (see **Figure 6.18**). In 2009, pockets of increased volatilities were preceded by sovereign

Chart 6.17 Foreign Exchange Risk Stress Test Results for the Banking System

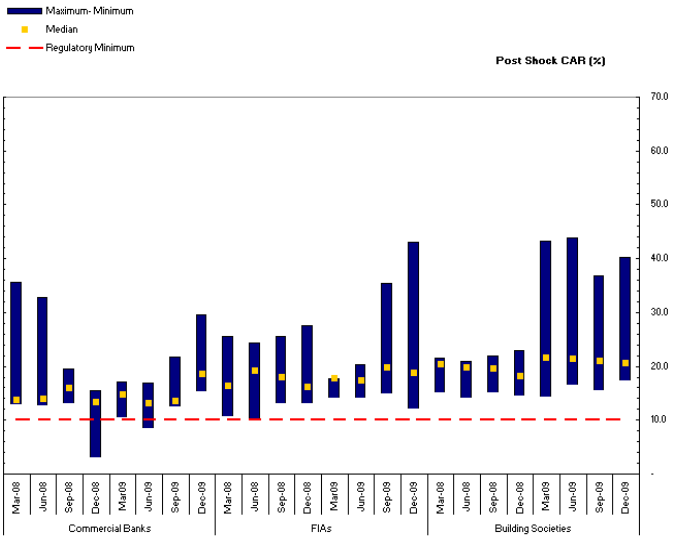
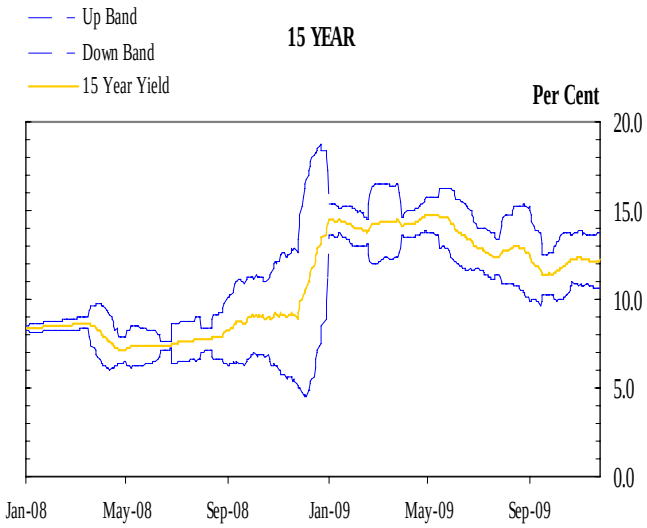


Chart 6.18 Spot Rates and 95.0 Per Cent Confidence Bands for Selected Global Bond Yields Over 2009



[41] The shock is first applied to the exchange rate between the Jamaica Dollar and the US dollar. The corresponding exchange rates of the Jamaica Dollar vis-à-vis the Euro, the Canadian dollar, and the Pound Sterling were then incorporated based on historical correlations with the selling rate for the US dollar between January to May 2003, a period of significant foreign exchange turbulence.

Chart 6.19 Dollar Value of a Percentage Point (DVPP) to Capital for Foreign Currency Interest Sensitive Assets and Liabilities

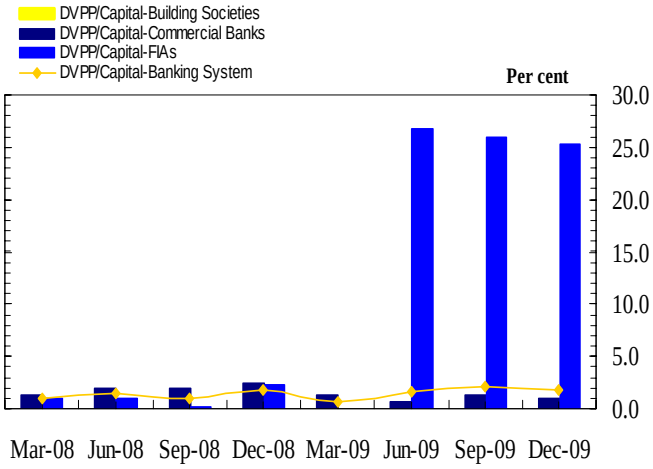
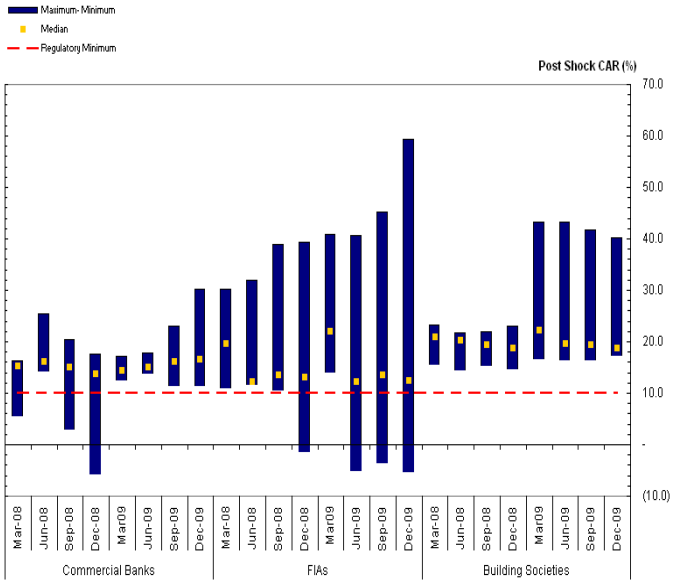


Chart 6.20 Interest Rate Risk Stress Test Results for the Banking System



bond rating downgrades in March, August, and November 2009 by key debt rating agencies (see **Figure 2.6**).

Foreign Dollar Value of a Percentage Point to Capital Base (FDVPC) Assessment[42]

The banking system's FDVPC remained virtually unchanged at 1.8 per cent end-2009 relative to end-2008. This outturn, however, significantly masked the developments in the market risk exposure of the sub-sectors during 2009. Specifically, commercial banks' FDVPC exhibited a trend decline to 1.0 per cent at end-2009 from 2.4 per cent at end-2008. In contrast, the FCVPC of FIAs increased significantly to 25.4 per cent at end-2009 from 2.3 per cent at end-2008. This increase in FIAs' FDVPC was reflective of a 24.5 percentage point increase at end-June 2009 relative to end-2008. Building societies were not significantly affected by increases in bond yields in 2008 or 2009 (see **Figure 6.19**).

Interest Rate Risk Stress Test Results

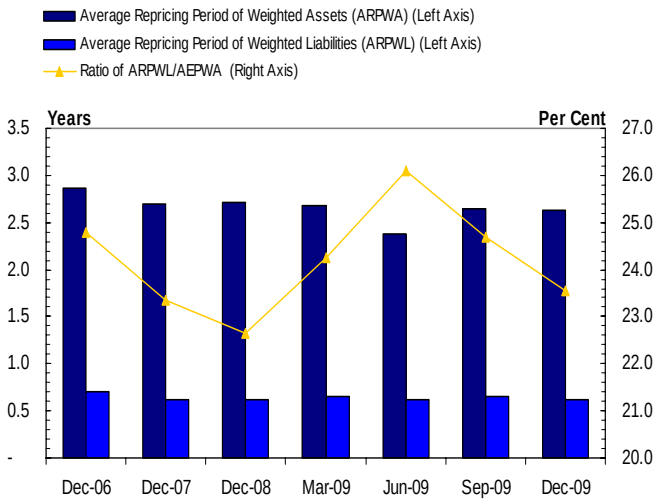
At end-2009, all commercial banks and building societies were adequately capitalised to absorb hypothetical losses associated with interest rate increases. FIAs, however, were most vulnerable to interest rate increases. Despite the median post-shock CAR of FIAs average of 12.7 per cent for the last three quarters of 2009, the results revealed that there was at least one institution that would become insolvent as a result of a hypothetical 1500 bps increase in domestic and 500 bps foreign interest rates. The median post-shock CARs of commercial banks increased to 18.6 per cent at end-2009 relative to 13.3 per cent at end-2008. The median post-shock CARs of FIAs declined to 12.3 per cent at end-2009 from13.0 per cent at end-2008 (see **Figure 6.20**).[43]

[42] The FDVPC captures the dollar value loss of a percentage point increase in global bond yields as a proportion of the capital base.

[43] A correlation of 30.0 per cent between domestic interest sensitive instruments and foreign denominated financial instruments was assumed, based on historical time series, to account for the lower sensitivity of foreign denominated instruments to domestic interest rate shocks. The framework assumes that all securities are fixed rate securities. However, approximately 48.0 per cent of Jamaica Government securities are variable rate securities.

For the last three quarters of 2009, FIAs revealed the highest disparity in post-shock CARs. During this period, the spread between the minimum and the maximum post-shock CARs for FIAs widened. The disparity in the post-shock CARs of commercial banks also increased towards end-2009. However, the range of post-shock CARs at end-2009 was narrower than that at end-2008. Furthermore, the range of post-shock CARs for commercial banks indicated greater resilience to interest rate risk during 2009 than during 2008. Building societies' range of post-shock CARs was wider in 2009 than in 2008. However, the range narrowed and minimum post-shock CARs increased towards the end of 2009, thus indicating greater resilience.

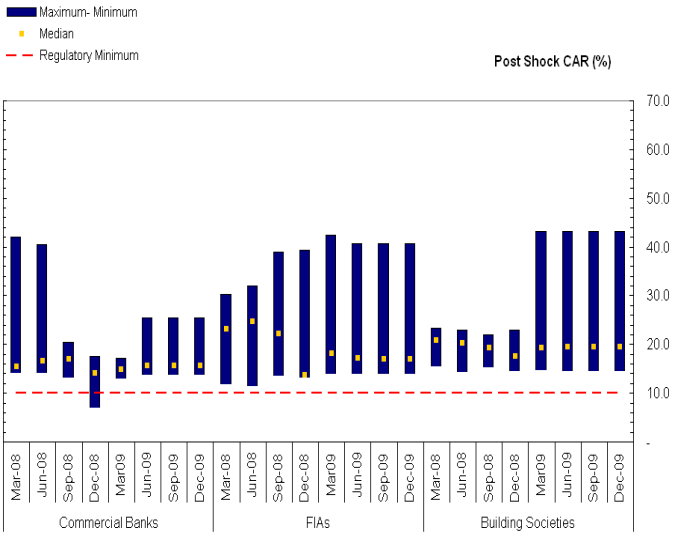
Chart 6.21 The Average Repricing Period of Weighted Assets and Liabilities



Interest Rate Liquidity Risk Stress Test Results

There was improved interest rate liquidity in the banking system as the ratio of the average repricing period of weighted liabilities to the average repricing period of weighted assets increased at end-2009 relative to end-2008 (see **Figure 6.21**). This reduced exposure was manifested in the stress test outturn as all institutions were adequately capitalised to absorb hypothetical liquidity losses associated with interest rate changes at end-2009. Specifically, after a hypothetical 1500/500 bps increase in domestic and foreign interest rates, the minimum post-shock CAR of all DTIs was 13.7 per cent, which was above the regulatory minimum. The median post-shock CARs of DTIs had declined during the crisis period in the December 2008 quarter but rebounded by end-2009. Additionally, the disparity in the post-shock CARs of FIAs and Building societies increased during 2009 relative to 2008. The disparity in the post-shock CARs of commercial banks revealed a trend increase since end-2008 to end-2009. This reflected both an increase in capitalization of banks, on the one hand, and a reduction in exposure to the risk vulnerability to the risk exposure, on the other (see **Figure 6.22**).[44]

Chart 6.22 Interest Rate Liquidity Risk Stress Test Results for the Banking System



[44] A correlation of 30.0 per cent between domestic interest rate sensitive instruments and foreign denominated financial instruments was assumed, based on historical time series, to account for the lower sensitivity of foreign denominated instruments to interest rate shocks assumed in the stress testing exercise. The justification for the non-symmetric shock can be gleaned from the observed divergence in the sensitivities of loan, deposit, and 180-day treasury bill rates to general interest rate shocks.

Chart 6.23 Repricing Composition of the Global Bond Investment of the Banking Sector

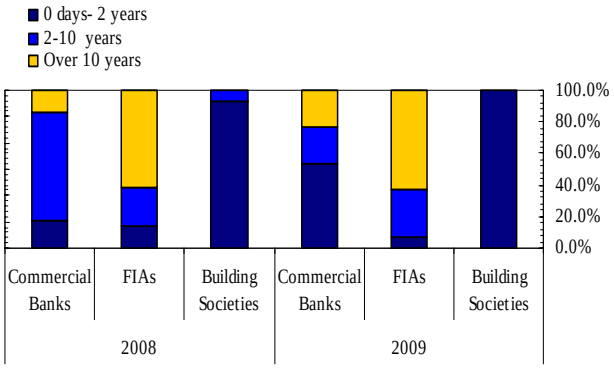
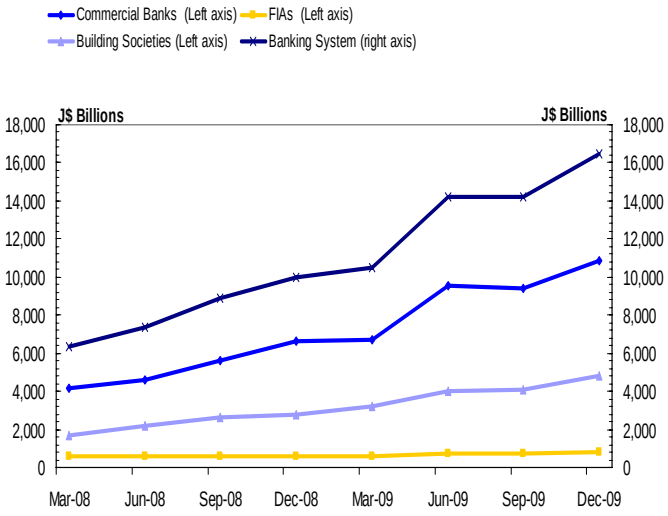


Chart 6.24 Non-Performing Loans for the Banking System



6.1.4 Foreign Exchange Rate Value at Risk (FXVaR) Assessment

The banking system's holding of GOJ global bonds declined to $83.5 billion at end-2009 from $85.4 billion at end-2008. At end-2009, global bond investments accounted for 42.6 per cent of the banking systems' investment portfolio relative to 43.8 per cent at end-2008. FIAs had a greater percentage of their global bond investments repricing after two years. Specifically, the portion of FIAs' global bond investments repricing after two years was 92.5 per cent at end-2009 compared to a ratio of 86.1 per cent at end-2008. In contrast, there was a shift in the profile of commercial banks' global bond investment profile to shorter durations. In particular, commercial banks' global bond investments repricing after two years was 46.0 per cent at end-2009 compared to a ratio of 83.0 per cent at end-2008 (see **Figure 6.23**). Building societies' global bond investments repricing after two years was zero at end-2009 and can be compared to a ratio of 6.5 per cent at end-2008.

In light of the developments in the Jamaica global bond market and trends in the DTI's investment profile, there was a 53.2 per cent decline to $3.7 billion in the VaR estimate on the GOJ global bond portfolio for the banking system at end-2009 relative to end-2008. The VaR estimate on global bonds accounted for 58.1 per cent of the total investment portfolio VaR of J$6.4 billion at end-2009 (see **Figure 6.11**).[45]

There was a significant decline in the FXVaR to the capital base for the banking system at end-2009 relative to end-2008 indicating that the banking system was better equipped to absorb losses related to market activities. Commercial banks, FIAs' and building societies' FXVaR to capital base were 4.0 per cent, 39.3 per cent and 0.1 per cent at end-2009 respectively, relative to 6.5 per cent, 144.5 per cent and 1.8 per cent at end-2008. This improvement, reflected both the significant decline in the VaR estimates and the increases in the capital base. However, FIAs

[45] Commercial banks, FIAs and building societies contributed $2.2 billion, $1.5 billion and $22.7 million, respectively to the total VaR outturn of $6.4 billion at end-2009.

continued to reveal continued susceptibility to market risk due to their investment in long duration GOJ global securities.

6.2 Credit Risk Assessment of the Banking System

Trends in Credit Risk Indicators of the Banking System

Total loans created by the banking sector increased by 4.8 per cent to $349.9 billion at end-2009 relative to end-2008. However, banking sector loan quality deteriorated during the year. This occurred in a context where the Jamaican unemployment rate increased by 0.7 percentage point to 11.6 per cent at end-2009 relative to end-2008 as well as the continued downturn in GDP growth.

Non-performing loans (NPLs) increased by 65.3 per cent to $16.5 billion at end-2009 relative to end-2008 (see **Figure 6.24**). Also, NPLs were 4.7 per cent of total loans at end-2009 from 2.7 per cent at end-2008. Furthermore, NPLs as a fraction of the banking system's capital base increased to 21.6 per cent at end-2009 from 16.0 per cent at end-2008, which was indicative of increased credit risk exposure. Building societies showed the greatest vulnerability as its NPLs to capital ratio increased to 28.9 per cent at end 2009 from 19.4 per cent at end-2008 (see **Figure 6.25**).

During 2009, the growth in credit risk to banking system arising from non-performing loans outweighed the growth in provision for loan losses. As such, there was a decrease in the ratio of provisions for loan losses to non-performing loans to 75.2 per cent at end-2009 relative to 86.5 per cent at end-2008 (see **Figure 6.26**).

Credit Risk Stress Test Results

Despite the increased credit risk exposure, all institutions were adequately capitalised to absorb hypothetical losses. In particular, at end-2009, after a hypothetical 50.0 per cent increase

Chart 6.25 Non-Performing Loans to the Capital Base for the Banking System

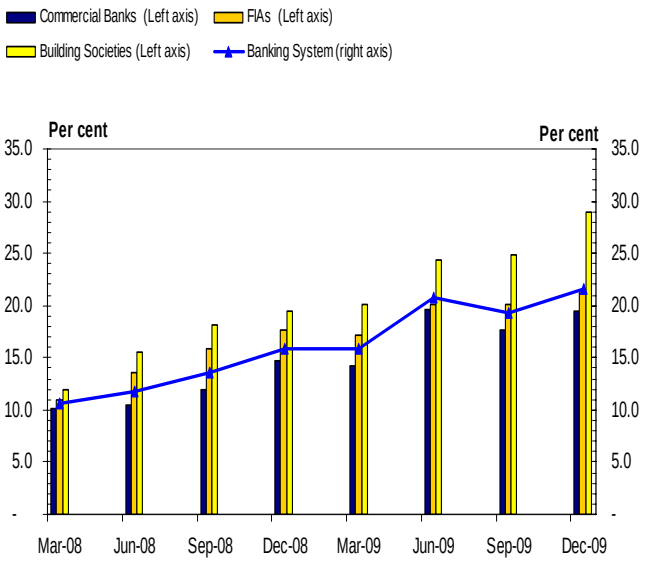


Chart 6.26 Loan Growth and Total Loan Provisioning for the Banking System

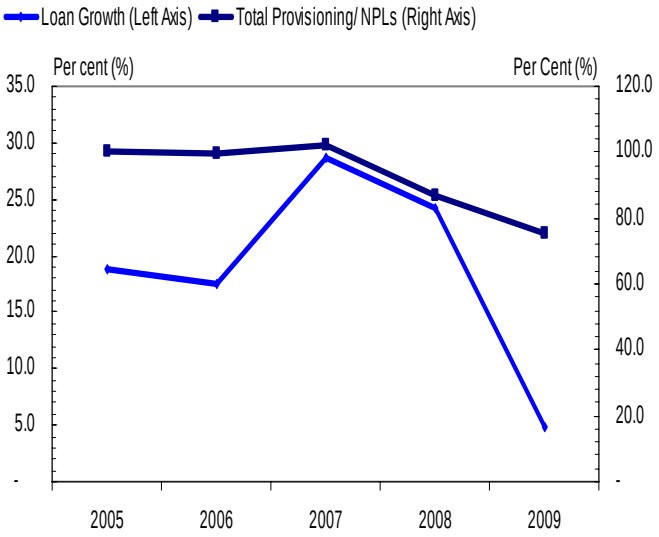
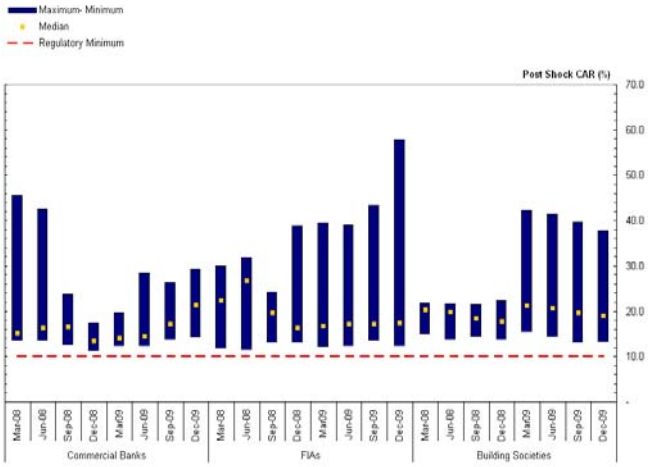


Chart 6.27 Credit Risk Stress Test Results for the Banking System (March 2008-December 2009)



to the stock of NPLs was applied to the balance sheets of the DTIs, the institution with the minimum post-shock CAR recorded a ratio of 12.3 per cent, 2.3 percentage points above the regulatory minimum. Over the year, there was a trend increase in the disparity of post-shock CARs of commercial banks and FIAs. Although the disparity in the post-shock CARs trended downward in 2009, they were still comparably higher than those of 2008 (see **Figure 6.27**).[46]

[46]The assumed provisioning for new NPLs is 100.0 per cent for loans outstanding 3 - 6 months; 6 - 12 months; and over 12 months. The loss in interest income resulting from the shocks to NPLs is calculated as the new NPLs multiplied by the average weighted loan rate for the respective institution.

7. Payments System Developments

7.1 Overview

Relatively low growth in currency in circulation continued to reflect the fall in economic activity since 2008. Also consistent with the contraction in real GDP, the average volume and value of transactions by cheque decreased for 2009. The dominance of value and volumes of electronic payments over cheque transactions continued to strengthen in 2009 relative to the previous year.

During the year, the Bank implemented two new payments systems – a Real Time Gross Settlement System (RTGS) and a Central Securities Depository (CSD). The RTGS was implemented to replace the Bank's Customer Inquiry Funds Transfer System (CIFTS). The average RTGS credit transfer for 2009 was significantly below the average credit transfer under the CIFTS for 2008, indicating lower payment system credit risk with the new system. CSD values and volumes increased considerably to $142.5 billion and 2 719 for December 2009 from $20.1 billion and 184 for May 2009, when the CSD was implemented.

Figure 7.1 Currency in Circulation

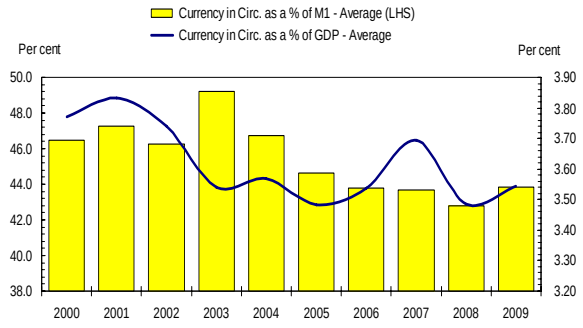
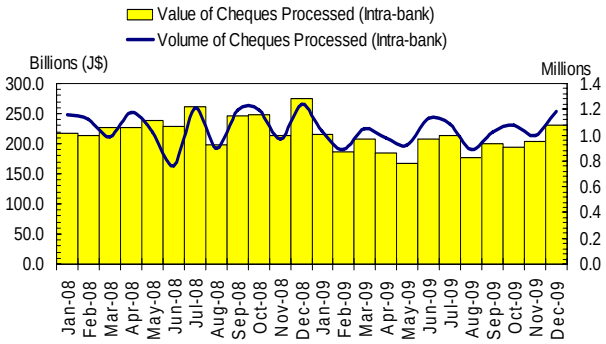


Figure 7.2 Cheque Intra-bank Volumes and Values



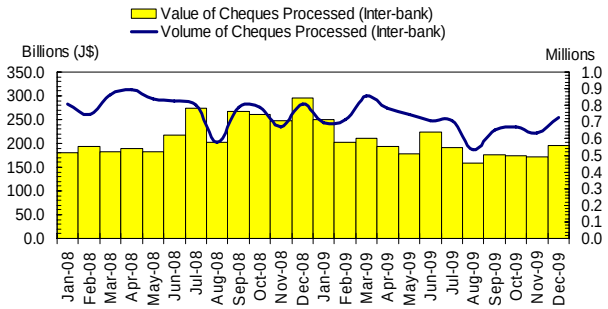
7.2 Traditional Means of Payment

Currency in circulation grew at a faster rate for 2009 than the increase experienced in 2008. In particular, currency in circulation for the year increased by 6.2 per cent to $44.6 billion compared to a 3.2 per cent growth for the previous year but substantially below the average annual growth of 15.0 per cent for the five years prior to 2008. This relatively low annual growth is consistent with continued dampened economic activity since 2008. Reflecting the point-to-point growth in currency, average currency in circulation grew by 9.2 per cent to $38.5 billion for 2009. This increase was higher than the 7.6 per cent growth for 2008, but below the average growth of 13.5 per cent for the five years prior to 2008.

Cash played a greater role in facilitating economic activity for 2009 relative to 2008 as lower interest rates resulted in lower opportunity costs of holding cash. Consequently, both the average levels of currency in circulation as a percentage of GDP and as a per cent of M1 rose by 1.7 per cent and 2.4 per cent at end-2009 compared to declines of 5.7 per cent and 2.0 per cent for 2008 (see **Figure 7.1**).

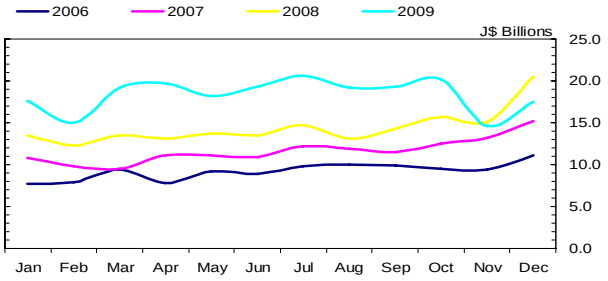
Also consistent with the contraction in real GDP, the average volume and value of transactions by cheque decreased for 2009 by 7.2 per cent and 14.1 per cent, to 1.7 million and $393.0 million, respectively. Notwithstanding these declines, the efficiency and safety of Jamaica Dollar cheque payments increased as reflected in higher volumes and values of

Figure 7.3 Cheque Inter-bank Volumes and Values



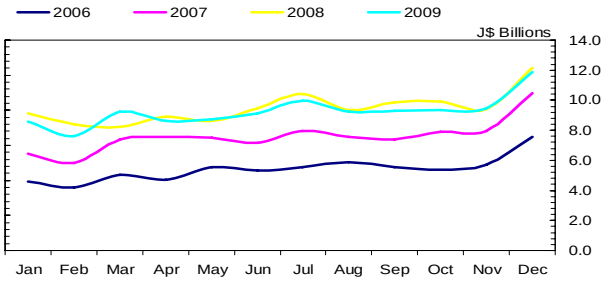
Source: JETS

Figure 7.4 ABM Values



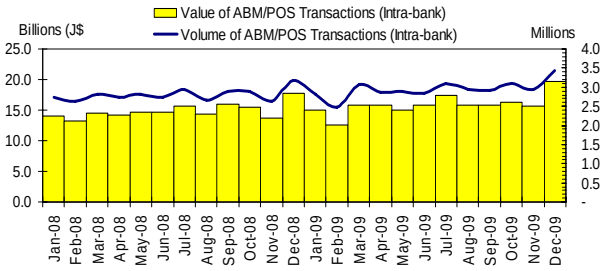
Source: JETS

Figure 7.5 POS Values



Source: JETS

Figure 7.6 ABM/POS Intra-bank Volumes and Values



Source: JETS

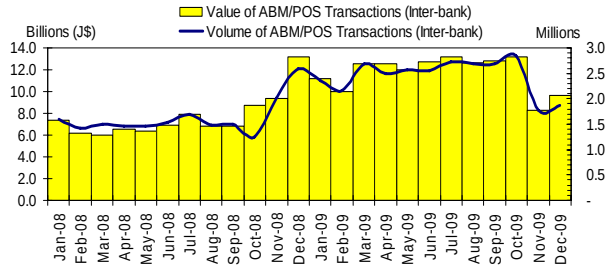
proprietary or intra-bank cheque payments for 2009 compared to the volume and value of inter-bank cheque payments (see **Figure 7.2** and **Figure 7.3**). However, the average transaction size of intra-bank cheque payments ($195 270.4) was lower than the average transaction size for inter-bank cheque payments ($277 169.0). This represented an 11.0 per cent reduction in the average transaction size of intra-bank cheque payments relative to a 5.0 per cent reduction for the average size of inter-bank cheque transactions.

7.3 Electronic Payment Instruments

Reflecting the growth in currency, ABM values grew by 27.5 per cent to $220.5 billion relative to growth of 23.7 per cent for 2008 (see **Figure 7.4**). Despite this higher annual growth, ABM values for November and December 2009 were lower than the values obtained in the corresponding months of 2008. Similarly, POS values grew by a slower rate of 14.0 per cent for 2009 to $111.1 billion compared to growth rates of 25.0 per cent and 40.0 per cent in 2008 and 2007, respectively (see **Figure 7.5**).

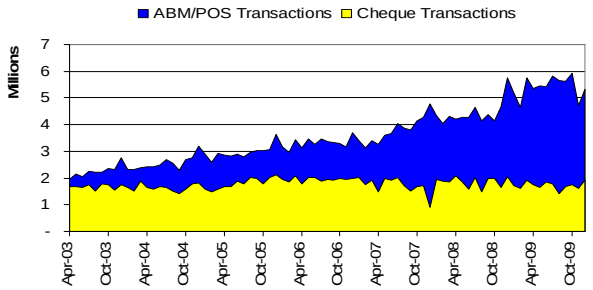
Abstracting from the last two months of 2009 when ABM/POS inter-bank values and volumes dipped substantially, the level of payment system safety through these electronic payments instruments continued to increase in 2009. Average monthly ABM/POS inter-bank values and volumes rose by 53.0 per cent and 51.0 per cent to $11.7 billion and 2.5 billion in 2009, respectively, compared to growth of 32.0 per cent and 15.0 per cent for 2008. Consequently, the shares of intra-bank values and volumes declined to 58.0 per cent and 55.0 per cent, respectively for 2009 relative to respective shares of 66.0 per cent and 63.0 per cent for 2008. Consistent with lower shares of intra-bank payment activity, average monthly intra-bank values and volumes increased only marginally to 7.0 per cent and 5.0 per cent in 2009 to $15.9 billion and 3 billion, respectively, compared to growth rates of 20.5 per cent and 18.5 per cent in 2008 (see **Figure 7.6** and **Figure 7.7**).

Figure 7.7 ABM/POS Inter-bank Volumes and Values



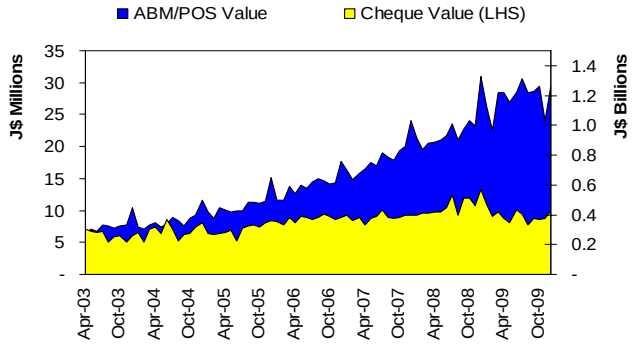
Source: JETS

Figure 7.8 Volumes of Transactions by Cheque Versus Electronic Payment Instruments



Source: JETS

Figure 7.8 Values of Transactions by Cheque Versus Electronic Payment Instruments



The dominance of electronic payments over cheque transactions strengthened in 2009 relative to the previous year (see **Figure 7.8)**. Total ABM/POS values and volumes increased by 23.0 per cent and 22.0 per cent, respectively, compared to growth of 24.0 per cent and 17.0 per cent for 2008. Alternately, total values and volumes of cheque transactions in 2009 fell by 14.0 per cent and 7.0 per cent, respectively, compared to growth of 20.0 per cent and 8.0 per cent for 2008. At end-2009 there were 419 ABMs and 13 342 POS terminals in operation, an increase relative to 405 ABMs and 12 468 POS terminals in operation at end-2008.

Jamaica Dollar (J$)-denominated debit cards in circulation continued to increase steadily during 2009 to approximately 1.7 million at end-2009 from 1.5 million at end-2008 (see **Figure 7.10**). However, credit cards issued in 2009 was outstripped by those cancelled in the year. Hence, J$ credit cards in circulation decreased during 2009 to 187 611 from 190 432 at end-2008.

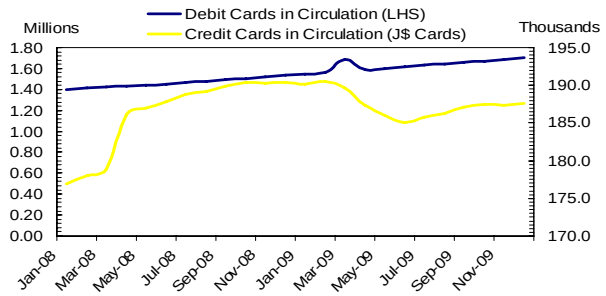
7.4 Large Value Transfer System

At end-February 2009, the Bank established a Real Time Gross Settlement (RTGS) system, JamClear-RTGS, to replace the existing large value system Customer Inquiry Funds Transfer System (CIFTS).[47,48] Authorised participants - including commercial banks, merchant banks, primary dealers, the JSE securities depository, the ACH and the Multilink system - are required to maintain settlement accounts with the BOJ. The latter three participants connect directly to the RTGS for daily deferred net settlement. The Central Securities Depository (CSD) was also established on 15 May 2009 and was fully integrated with the RTGS to enable Delivery versus Payment (DvP).

[47] JamClear-RTGS is the real time, electronic payments system for large value transactions, which is owned and operated by the BOJ. As under CIFTS, the Bank continues to be the settlement agent for participants.

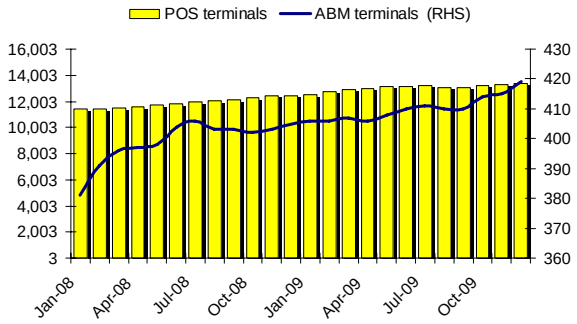
[48] The CIFTS network system was a deferred settlement system operated by the BOJ that facilitated the electronic transfer of funds in local currency between the accounts of commercial banks, primary dealers as well as the Central Securities Depository and its broker members.

Figure 7.09 Debit and Credit Cards in Circulation



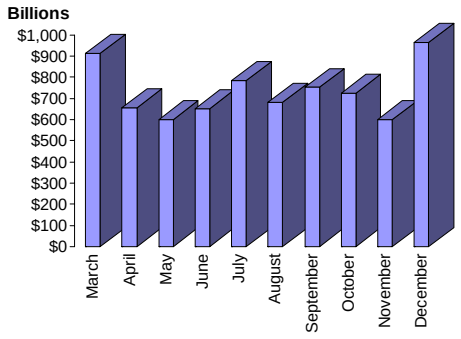
Source: JETS

Figure 7.10 Number of ABMs and POS Terminals



Source: JETS

Figure 7.11 RTGS Monthly Transaction Values



The total value of RTGS transactions was approximately $7 335.0 billion for the last 10 months of the review year. Hence, the average RTGS credit transfer for 2009 was $75.9 million, significantly below the average credit transfer under the CIFTS system of $144.0 million for 2008, indicating lower payment system credit risk with the new system.

The average monthly RTGS value was $733.5 billion with a monthly standard deviation of $124.2 billion for 2009. December recorded the highest monthly RTGS value of $964.5 billion (see **Figure 7.11**). The average monthly RTGS volume was 96 670 with a monthly standard deviation of 877 for 2009 (see **Figure 7.12**)

Transactions processed in the JamClear-CSD during 2009 included issues and maturities of BOJ open market instrument and secondary market transactions. There was a dramatic increase in CSD usage since implementation of the system in May 2009 (see **Figure 7.13**). Total respective value and volume of CSD transactions increased considerably to $142.5 billion and 2 719 for December 2009 from $20.1 billion and 184 for May 2009. The introduction of GOJ securities to the CSD following the completion of the immobilization and dematerialization process in 2010 is anticipated to significantly increase the values and volumes traded.[49]

Adequate intra-day liquidity is required by RTGS participants throughout the business day to alleviate the build up of queues in the system so that 'real-time' payments can be effected by these financial institutions. Intra-day liquidity can be obtained in the RTGS system through: balances maintained in the participant's settlement account; funds transferred from other systems, such as the ACH; payments received from other participants and intra-day liquidity extended by the BOJ.

[49] GOJ instruments were not dematerialized or immobilized during 2009.

Figure 7.12 RTGS Monthly Transaction Volumes

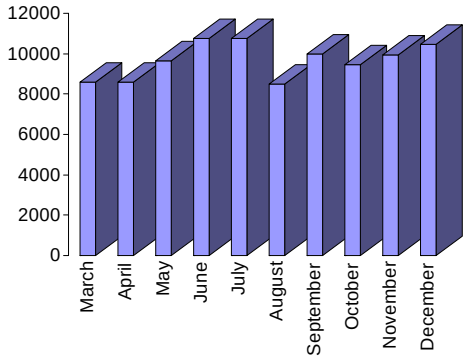


Figure 7.13 CSD Monthly Transaction Values and Volumes

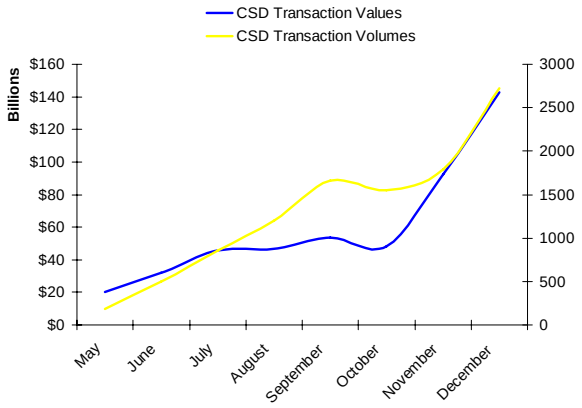


Figure 7.14 BOJ Intraday Loan Facility Monthly Transaction Values and Volumes

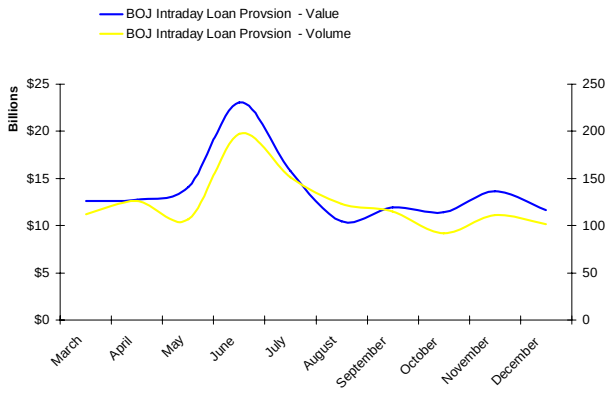
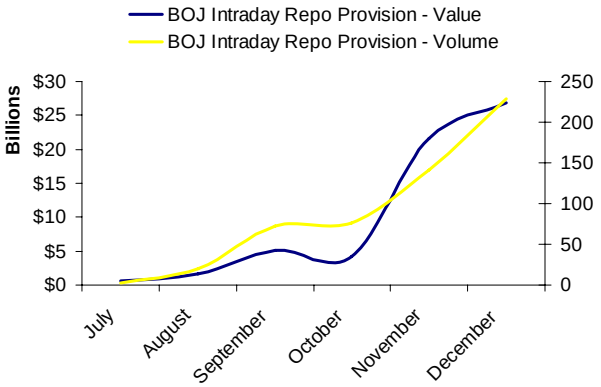


Figure 7.15 BOJ Intraday Repo Facility Monthly Transaction Values and Volumes



Both intra-day loan and intra-day repo facilities were established in 2009 by the BOJ to shore up liquidity shortfalls of RTGS participants. Intra-day loans, which use collateral accounts held by the BOJ, were primarily relied on prior to the establishment of the JamClear-CSD. The Bank's provision of intra-day loans averaged about $13.8 billion per month since March 2009 and was concentrated mainly in the same two or three institutions (see **Figure 7.14**).

The provision of intra-day repos is limited to short-term GOJ and BOJ securities that are dematerialized in the CSD, guaranteeing gross payment versus gross delivery. Access to the intra-day 'Auto Repo' facility was offered by the Bank starting in July 2009 which complemented the Bank's intra-day loan facility. Use of the intra-day repo facility grew rapidly both in terms of value and volume in 2009, exceeding the value and volume of intra-day loans provided by the BOJ in December 2009 (see **Figure 7.15**).

Articles

A CGE Framework for Evaluating Financial Stability: case of Jamaica

By Jide Lewis
Snr. Economist
Financial Stability Department

Section I: Introduction[50]

This article explores the application of a computable general equilibrium (CGE) framework to the evaluation of financial stability of the banking sector in Jamaica. This CGE framework, which follows the work of Goodhart *et al*. (2006), incorporates heterogeneous banks and capital requirements with incomplete markets, money and default. Further, agents in the model interact in several financial markets in an infinite horizon setting.

A major cause of systemic problems within the financial system is the contagious interaction between individual participants, in particular banks. However, most mainstream macroeconomic frameworks are based on an implausible assumption that no economic agent ever defaults (Bardsen *et al*., 2006). While this assumption enormously simplifies macroeconomic modelling by allowing for the use of representative agents, it paves the way for macroeconomic analyses and policy prescriptions which are inherently flawed. This flaw has become even more pronounced against the backdrop of the current global economic and financial turmoil.

In order, therefore, to develop an empirically tractable assessment of the risks to banking system stability, some key characteristics that macroeconomic frameworks should capture include an endogenous risk of default, explicit roles for money, banks and liquidity as well as structural micro-foundations (see Goodhart, 2005).

Section II provides a brief description of literature on bank stability and **Section III** gives an overview of the CGE framework. Finally, in **Section IV** the simulation results for Jamaica are discussed and **Section V** closes with some policy implications.

Section II: Overview of the Literature

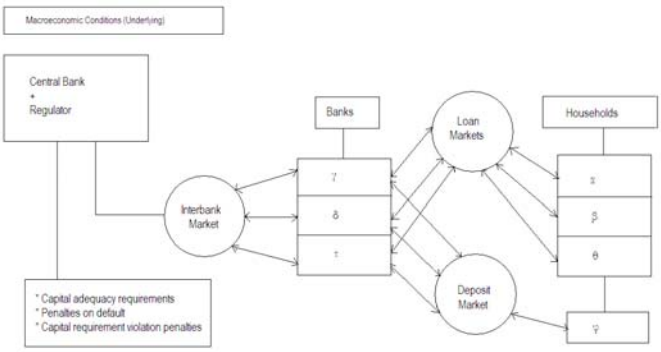
In the study of financial stability, researchers have employed two broad approaches each with its own sets of advantages and limitations. The first approach involves estimating the likelihood of defaults for individual banks or even systemic financial crises arising from fluctuations in a set of predetermined variables. The other approach establishes frameworks based on optimizing micro-foundations (Goodhart and Dimitrios, 2008).

An Overview of Empirical Frameworks

Empirical studies such as Gavin and Hausmann (1996) and Sachs *et al*. (1996) show that some key macroeconomic parameters act as key indicators of an impending banking crisis. For example, credit growth, equity price declines as well as the ratio of broad money to foreign exchange reserves have been identified as critical variables in the evaluation of banking sector vulnerabilities. Other papers, Crokett

[50] This is article is based on paper by Lewis, 2010, Journal of Business, Finance and Economics in Emerging Economies (Forthcoming).

Figure 1. The Block Structure of the CGE Model



(1997), Gonzalez-Hermosillo (1999) and Hardy *et al*. (1998) show that the amount of non-performing loans (NPLs) increases markedly before and during a crisis, and bank profitability falls. These approaches encourage the evaluation of financial stability issues along a continuum of possible contingent states, as opposed to polar or binary evaluations of what constituted a financial crisis.

An Overview of Theoretical Frameworks

At the theoretical end of the spectrum a plethora of models, primarily game-theoretic in nature, were developed over the last decade. Most of them depend on assumptions of asymmetric information and some type of moral hazard. Allen and Gale (1998), for example, propose a framework where uncertainty is generated by the lack of knowledge about when depositors may need to withdraw their money from the bank. Early redemption of an illiquid asset in the case of run can only be done at a cost. So much so, that, the bank may not be able to honour its pledge to redeem all its deposits (plus stated interest) at par. When the probability of failure to repay rises a run ensues and the bank defaults. Other theoretical approaches consider defaults as arising from declines in the value of bank assets, e.g. arising from credit or market risk. Suarez and Sussman (2007), for example, investigate the dynamic implications of financial distress and bankruptcy law. The effect of liquidations on the price of capital goods, due to financial imperfections, generates endogenous cycles.

Several factors can be put forward as limiting the performance of these theoretical frameworks. However, from a bank surveillance perspective, the chief drawback would be that almost all of these models have not been calibrated or tested with real data (e.g. Allen and Gale, 1998).

Section III: The CGE Model

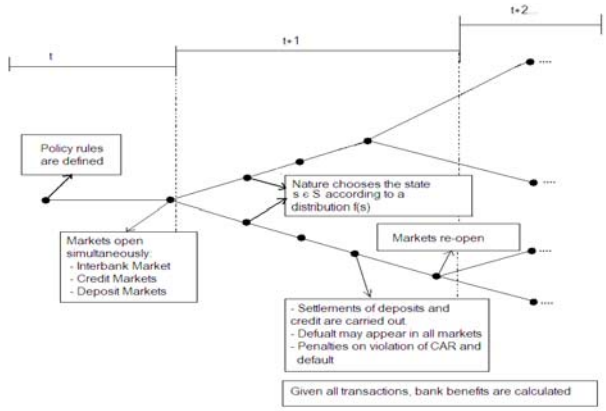
This CGE framework *a la* Goodhart *et al*. (2006) is calibrated to conform to time-series data of Jamaica's banking system between 2005 and 2008. The model incorporates financial interactions among three heterogeneous banks, four private sector agents, and the Bank of Jamaica (see **Figure 1**). Specifically, the banking sector comprises of three heterogeneous banks, $b \in B = \{\gamma, \delta, \tau\}$, representing commercial banks, merchant banks and building societies, respectively.

For each bank there exists a credit market in which each bank γ, δ *and* τ interacts with their representative clients α, β and θ, respectively. Alternately, each bank in its respective deposit market interacts with an agent, φ, who supplies funds to the banking system. This agent, φ, represents the pool of depositors in the Jamaican economy.

The time structure of the model is is as follows. At the end of period *t*, the deposit market, credit

market, and the interbank market open simultaneously. Each bank decides rationally how much credit to offer and the amount of deposits it demands from the respective markets, forming expectations over the two possible future states of nature. Banks also trade among themselves, to smooth out their individual portfolio positions.

Figure 2: The Time Structure of the CGE Model



Meanwhile, households borrow from, or deposit money with banks, mainly to achieve a preferred time path for consumption. Finally, the central bank conducts open market operations to influence the money supply and thereby determine the official interest rate. In the beginning of period $t+1$, one of the possible states $s \in S = \{i, ii\}$ occurs. Where according to which state s happens, the financial contracts signed in the previous period are settled and some level of default may occur. Banks are subject to default and capital requirements' violation penalties which are applied where applicable. At this point, bank profits are realized, after which all markets re-open (see **Figure 2**).

Domestic Banking sector

As mentioned earlier, the banking sector comprises of three heterogeneous banks. Each sector is distinguished by its unique portfolio deriving from different capital endowments and risk return preferences. The asset side of their balance sheets consists of loans, interbank lending, and investments, while liabilities include deposits, interbank borrowings, other liabilities and capital. Banks borrow from the non-bank private sector by way of deposits and from each other and the BOJ via the interbank market. They also extend credit to the private sector and hold a diversified portfolio of securities.

Following, Goodhart *et al*. (2006), the behaviour of household borrowers and their default rates, the supplier of deposits, and the evolution of GDP are endogenised by estimating reduced-form equations.[51]

Market clearing conditions

There are seven active markets in the model including three for consumer loans, three for deposits and one interbank market. Each of these markets determines an interest rate that equilibrates demand and supply.

Calibration of the Model to the Jamaican Banking Sector

The calibration exercise is based on annual balance sheet and Profit and Loss (P&L) data of Commercial banks, Merchant banks and Building societies between March 31 2005 and March 31 2008. The model is initialized to capture key features of the banking sector in 2005. Then the behaviour of the banks in subsequent periods is simulated capturing, among other variables, the evolution of loans and household repayment rates over time.

[51] See (Lewis 2010) Appendix B for further discussion on how the parameters for these reduced form equation were estimated for Jamaica.

Simulation Results

For each sub-sector of the banking system in Jamaica, the endogenously generated variables include loans and household repayment rates (see **Figure 3** and **Figure 4**). The simulation results are presented against the actual observed values for the period 2005 to 2008.

The simulation results for loans over the period indicate a strong empirical fit as indicated by the reciprocal of the Theil's U statistic all being in excess of 0.90. [52] Importantly, the model also captures the relative size of the loan portfolios of the various sectors as well as the general trend in the actual data. It should be noted, however, that for commercial banks the model overestimates the pace of growth in loans towards the end of the 3-year horizon (c.f. **Figure 3**).

The simulated household repayment rates, the reciprocal of NPLs, captured the actual evolution of the data well. The simulation exhibits the best forecasting fit for both commercial banks and building societies with Theil's U statistics of 0.002 and 0.01, respectively. That is, the simulation captures the general improvement in the NPL ratios over the period. For merchant banks, the model overestimated the deterioration in their loan portfolio intra-period but picked the first quarter of 2008 (c.f. **Figure 4**).

Section IV: Conclusion

This article evaluated the performance of the CGE model of the financial system when applied to the case of Jamaica. The simulation results are encouraging from a surveillance perspective since regulators can be proactive in their capacity as oversight agents to preserve both financial stability and the orderly functioning of markets. The framework provides forecasts over the medium-term of the evolution of the balance sheets of the deposit-taking sector under clearly specified macroeconomic conditions. This which facilitates the monitoring of potential 'concentration risks', on the one hand, as well as monitoring of potential systemic imbalances in the banking system, on the other.

[52] The Theil's U measures how well the model predicts against a 'naive' model. It is used to evaluate the forecasting performance of the model (1 - Theil's U).

Figure 3. Dynamic Simulation of the Banking Sector Loans in Jamaica (2005 – 2008)

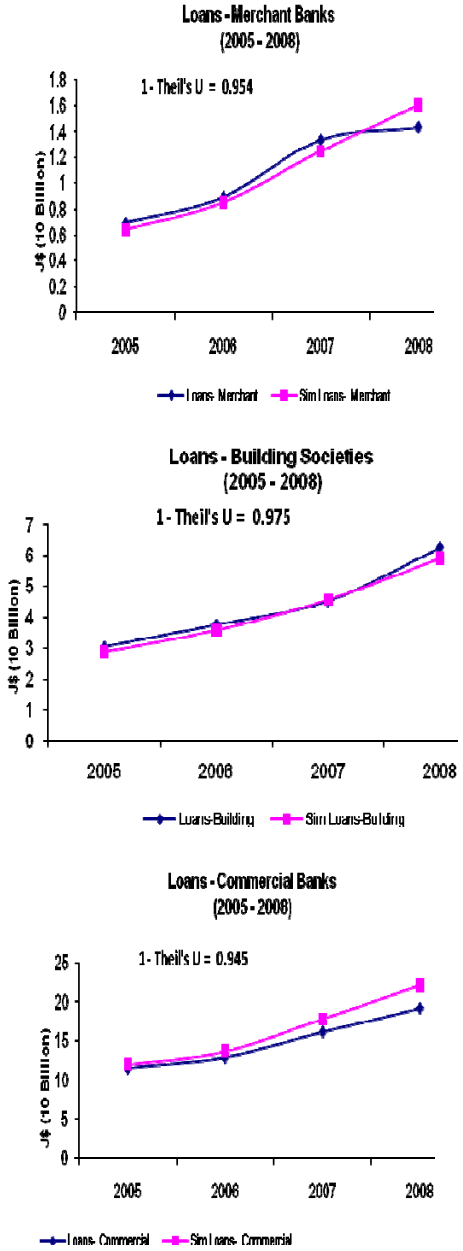
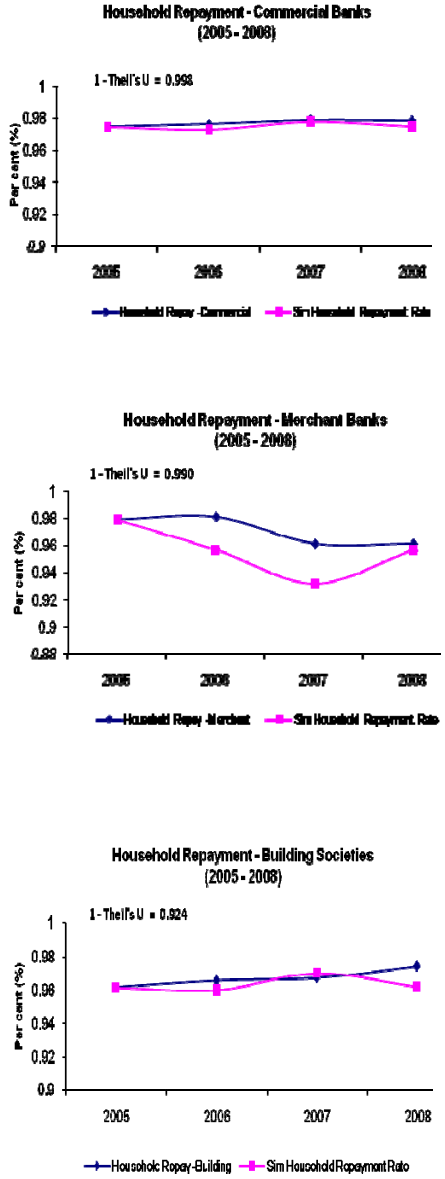


Figure 4. Dynamic Simulation of the Household Repayment Rates in Jamaica (2005 – 2008)



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An Assessment of Stability in the Jamaican Banking Sector

Verlis C. Morris
Summer Intern
Financial Stability Department

Section I: Introduction

The purpose of this article is to provide an assessment of stability in Jamaica's banking sector using an aggregate financial stability index (AFSI). The model utilized is based on the methodology employed by Albulescu (2010), which derives a single financial stability index.[53] The index is comprised of microeconomic, macroeconomic and international factors indicative of banking sector performance and was developed using data over the period March 1997 to March 2010. Section II considers the methodology employed in constructing the index. In section III, there is a discussion of the evolution of the AFSI and its constituent sub-indexes. Section IV provides a forecast of the AFSI using Monte Carlo Simulations. Finally, Section V provides the conclusions from the analysis.

Section II: Framework for Measuring AFSI

For Jamaica, 19 indicators were chosen for inclusion in the AFSI. These indicators were reflective of different aspects of financial stability, including financial development; financial vulnerability, financial soundness, as well as the world's economic climate (see Table 1). Sub-indexes were also created to capture the different dimensions of financial stability.[54]

The financial development sub-index gives a measure of the level of financial system development and includes variables covering market depth; concentration and market efficiency (see Table 1).

Regarding the financial vulnerability sub-index, indicators included in this category cover key macroeconomic variables as well as the funding structure of banking institutions. The variables retained in the financial soundness sub-index measures the solvency of credit institutions in the banking sector (see Table 1). Regarding the world economic climate sub-index, indicators that fundamentally impact both local and foreign investors' confidence level in the financial system are included.

Indicators were normalized for inclusion in the index and to allow for comparability across variables. Following normalization, indicators' values ranged between 0 and 1, where a value of 0 represents the weakest value of an indicator.

More specifically, the formula used for the normalization process is:

$$ {}_{n}I_{it} = \frac{I_{it} - \min(I_i)}{\max(I_i) - \min(I_i)} \qquad (1) $$

where ${}_{n}I_{it}$ represents the normalized indicator at time t and I_{it} represents the value of the indicator at time t. In addition, $\max(I_i)$ and $\min(I_i)$ represent the respective worst and best values of each indicator.

[53] See Albulescu, Claudiu Tiberiu. 2010. "Forecasting Romanian Financial System Stability Using a Stochastic Simulation Model." Romanian Journal of Economic Forecasting, 13(1): 81-98.

[54] For banking sector variables, data was collected on the commercial banks, merchant banks and building societies and classified in terms of sub-indexes.

After normalization, indicators were combined into their respective sub-indexes (see equations 2- 5):

financial development index,

$$\overline{D}_t = \frac{\sum_{i=1}^{4} D_{it}}{4} \qquad (2)$$

financial vulnerability index,

$$\overline{V}_t = \frac{\sum_{i=1}^{8} V_{it}}{8} \qquad (3)$$

financial soundness index,

$$\overline{S}_t = \frac{\sum_{i=1}^{4} S_{it}}{4} \qquad (4)$$

world economic climate index,

$$\overline{W}_t = \frac{\sum_{i=1}^{3} W_{it}}{3} \qquad (5)$$

Finally, the aggregate financial stability index is composed as follows:

$$AFSI_t = \frac{4\overline{D}_t + 8\overline{V}_t + 4\overline{S}_t + 3\overline{W}_t}{19}$$

In constructing the AFSI equal weights are applied across the indicators while the sub-indexes are unevenly weighted. The vulnerability index is the most heavily weighted while the world indicator was given the least weighting, with the development and soundness sub-indexes receiving equal weights. The vulnerability index received majority weights because it captures a wider range of risks, in particular macro-economic risks and bank-specific factors. Also, among the other sub-indexes it tracked the crisis periods the closest.

In constructing the AFSI equal weights are applied across the indicators while the sub-indexes are unevenly weighted.[55]

Table 1

Indicators		Sub-group
Market Capitalization/GDP	+	Financial Development Index
Total Credit/GDP	+	
Interest Spread	-	
Herfindahl–HirschmannIndex (HHI)	+	
Inflation Rate	-	Financial Vulnerability Index
General Budget Deficit/Surplus(%GDP)	+	
Current Account Deficit/Surplus (GDP)	+	
REER (change)	-	
NonGovernmental Credit/Total Credit	+	
Loans (%deposits)	-	
Deposits/M2 ("moving ratio")	+	
(Reserves/Deposits)/(Note & Coins/M2)	+	
NonPerforming Loans/Total Loans	-	Financial Soundness Index
Capital/Assets	+	
Z-Score	+	
Liquidity Ratio	+	
World Economic Growth	+	World Economic Climate Index
World Inflation Rate	-	
Economic Climate Index	+	

Note: The effect of an increase in each indicator on the AFSI is indicated by the corresponding signs shown in the middle column of the table.

[55] Due to data limitations coupled with reduced number of observations associated with degrees of freedom econometric estimations of the weights were not employed. Thus the paper resorts to a standard procedure of equal weightings.

Section III - Evolution of the AFSI & its Constituent Indexes

The evolution of the AFSI and its sub-indexes closely tracked stability in the Jamaican banking sector over the sample period (see Figure 1). Moreover, the index was successful in capturing key periods of financial instability and reflected a general improvement in stability. A general sharp deterioration was observed in the AFSI and its sub-indexes during the financial crisis period of the late 1990s, with the index averaging below 0.5. This performance was strongly influenced by the financial soundness sub-index. Subsequent to this period, there was consistent improvement in the AFSI, with values ranging between 0.54 and 0.65, consistent with a relatively stable financial sector. During 2003, primarily in the second quarter, a deterioration as low as 0.49 was observed which occurred amidst instability in the foreign currency exchange rate causing the Bank of Jamaica to increase interest rates. There was also a sharp fall-off in the index during the global financial crisis period that culminated in 2008, strongly evidenced by the significant fallout in the world economic climate sub-index.

Section IV - AFSI forecast using Monte Carlo Simulation

The variables employed in the AFSI forecast were significant in explaining the variability in the index. These variables are outlined in equation 6[56]:

$$afsi = c + \alpha * afsi_{t-1} + \beta * afsi_{t-2} + \delta * \Delta tbill + \gamma * m2 + \eta * m2_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots(6)$$

where *afsi* is the aggregate stability index, *tbill* is the yield on 6-month Treasury bill and *m2* is the growth in money supply (M2). The regression results show that the values of the AFSI in previous quarters will impact the present value of the index. In addition, there is a negative relationship between the 6-month Treasury bill yield and the AFSI, indicating that increases in interest rates can stimulate deterioration in aggregate stability such as by influencing an increase in the default rate on loans. The signs on the M2 variables are somewhat contradictory; the one period lag has a positive effect on the index while the contemporaneous effect is negative. The explanation for this is that current period growth in the money supply is partly unobservable. However, unexpected growth in money supply can lead to inflation 'surprises' which can stimulate deterioration in stability

The historical values of the AFSI and the exogenous variables reflected in equation 6 were utilized in producing a forecast of the index. Both the Treasury bill yield series and the M2 growth rate series were fitted with a distribution function based on their historical values. Using the fitted distributions as well as correlation between the exogenous variables in the estimation and Monte Carlo simulation (10 000 iterations), a forecast of the AFSI was generated along with a fan chart for the forecasted values of the AFSI up to March 2011 (see Figure 2). Regarding forecast results, the deterioration evident in the index during the second half of 2010 is largely reflective of the impact of anticipated seasonal increases in M2 during this period.

[56] All variables used in the regression were subjected to stationary tests. The series' with unit roots were stationary in first differences.

Section IV: Conclusion

The evolution of the AFSI shows a close reflection of banking sector performance over the period March 1997 to March 2010. The index represents a single comprehensive measure of financial stability and can be used as an early warning tool for policymakers as various dynamic simulation techniques can be used to predict stability in the banking sector. Forecast results from the study predict deterioration in the index in the short-term. This is influenced by seasonal increases in M2 during the second half of 2010 and reflects the potential consequences of inflationary impulses on financial stability.

Figure 1: AFSI & Constituent Sub-Indexes

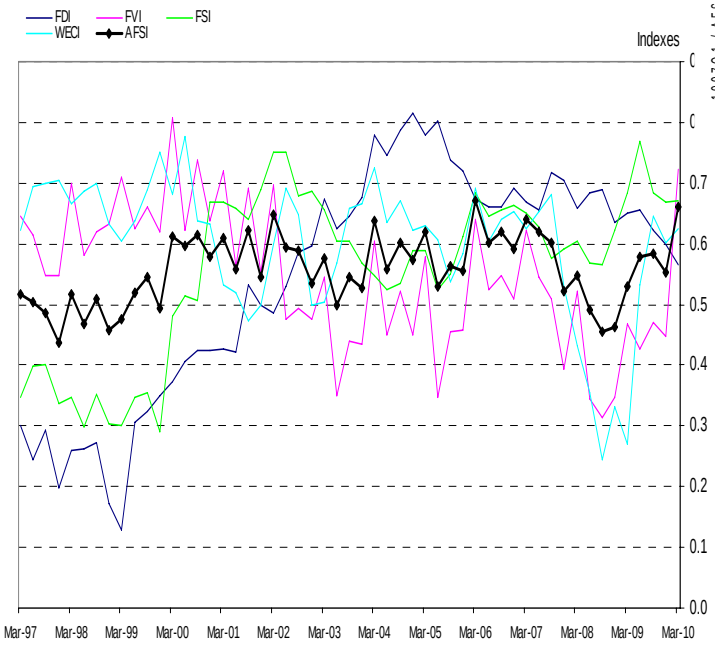
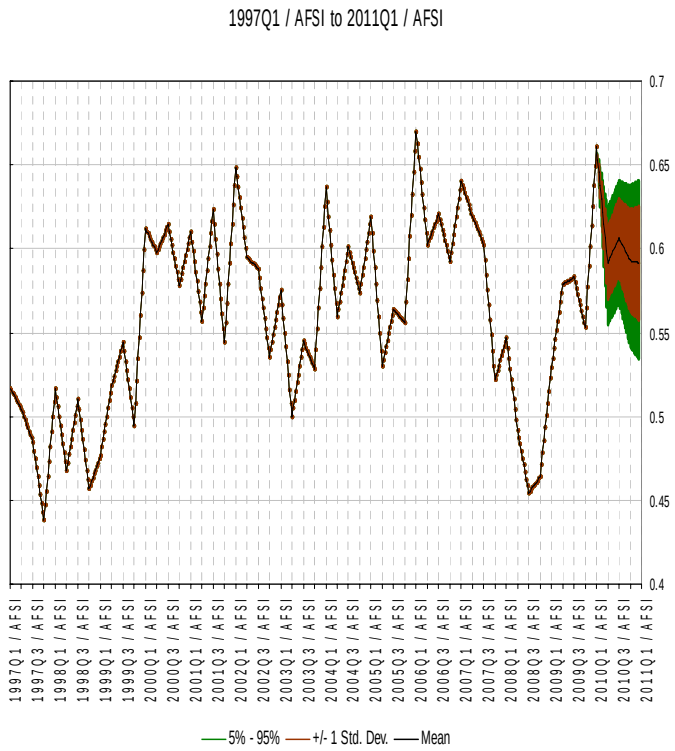


Figure 2: A Forecast of the AFSI for Jamaica's Economy



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Glossary

Asset Utilization	Measurement of the effectiveness of an institution's investment in earning assets. This ratio calculates the overall yield on earning assets.
Automated Clearing House	A facility that computes the payment obligations of participants, vis-à-vis each other based on payment messages transferred over an electronic system.
Central Securities Depository	An institution which provides the service of holding securities and facilitating the processing of securities transactions in a book entry (electronic) form.
Certificate of Participation	A financial instrument in which an investor has a *pro rata* share in a specific lease revenue made by a municipal or government entity and is subjected to annual appropriation.
Concentration Risk	The risk associated with the possibility that any single exposure produces losses large enough to adversely affect an institution's ability to carry out their core operations.
Consumer Confidence Index	An indicator of consumers' sentiments regarding their current situation and expectations of the future.
Credit Rating	An evaluation of the likelihood of a borrower's default on a loan. Sovereign credit ratings assess the likelihood that a sovereign entity will default on its obligations.

Credit Risk	The risk that a counterparty will be unable to settle payment of all obligations when due or in the future.
Deferred Net Settlement	The settlement of transfer orders netted at designated times between or among counterparties in order to economize on the number and value of transactions.
Delivery versus Payment	A mechanism which ensures that the transfer of payment from a payment system occurs if and only if the delivery of securities from a securities system occurs.
Disposable Income	The remaining income after taxes has been paid which is available for spending and saving.
Financial Conglomerates	Financial institutions which undertake a wide range of activities such as banking, stocking broking, insurance and fund management.
Financial Intermediation	The process of channeling funds between lenders and borrowers. Financial institutions are regarded as financial intermediaries because of their role in transforming long-term lending or investment from shorter-term deposits or savings.
Fiscal Deficit	The excess of government expenditure over revenue for a given period of time.
Foreign Exchange Risk	The risk associated with potential losses incurred by an institution by holding foreign currency-denominated instruments due to adverse movement in the exchange rate.

Funds Under Management/ Managed Funds	The management of various forms of client investments by a financial institution.
GAP Ratio	The ratio of cumulative differences between interest bearing assets and liabilities over various time horizons (e.g. less than 1 year, 1-2 years) to total assets.
Hedging	Strategy designed to reduce investment risk or financial risk. For example, taking positions that offset each other in case of market price movements.
Interest Margin	The dollar amount of interest earned on assets (interest income) minus the dollar amount of interest paid on liabilities (interest expense), expressed as a percent of total assets.
Interest Rate Risk	The risk associated with potential losses incurred on various financial instruments due to interest rate movements.
Intraday Credit	Credit extended to a payment system participant that is to be repaid within the same day.
Large Value Transfer System	A payment system designated for the transfer of large value and time-critical funds.
Liquid Ratio	The ratio of average prescribed assets to average prescribed liabilities.
Liquidity Risk	The risk that a counterparty will be unable to settle payment of all obligations when due.
Net Open Position	The difference between long positions and short positions in various financial instruments.
Non-Performing Loans	Loans whose payments of interest and principal are past due by 90 days or more.
Off-Balance Sheet Items	Contingent assets and debts that are not recorded on the balance sheet of a company. They are usually note worthy as these items could significantly affect profitability if realized.

Payment System	A payment system consist of the mechanisms - including payment instruments, institutions, procedures, and technologies - used to communicate information from payer to payee to settle payment obligations.
Payment Versus Payment	A mechanism which ensures that the transfer of payment occurs if and only if the final transfer of a counterparty payment is simultaneously received.
Preferences shares	Capital stock which provides a specific dividend that is paid before any dividends are paid to common stock holders, and which takes precedence over common stock in the event of liquidation
Prescribed Liabilities	These refer to a) deposit liabilities, b) reservable borrowings and c) interest accrued and payable on a) and b).
Real-Time Gross Settlement System	A gross settlement system in which payment transfers are settled continuously on a transaction-by-transaction basis at the time they are received (that is, in real-time).
Repurchase Agreement (Repo)	A contract between a seller and a buyer whereby the seller agrees to repurchase securities sold at an agreed price and at a stated time. Repos are used as a vehicle for money market investments as well as a monetary policy instrument of BOJ.
Retail Payment System	An interbank payment system designated for small value payments including cheques, direct debits, credit transfers, ABM and POS transactions.
Stress Test	A quantitative test to determine the loss exposure of an institution using assumptions of abnormal but plausible shocks to market conditions.

Systemic Risk	The risk of insolvency of a participant or a group of participants in a system due to spillover effects from the failure of another participant to honour its payment obligations in a timely fashion.
Value at Risk (VAR)	A metric or statistical technique that seeks to estimate the loss that an institution will not exceed over a specified time period with a given probability.